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Elephant (Makhna) in 'must' suspected to have trampled to death nine persons. —Photo by S.P. Shahi



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Honorary Secretary.

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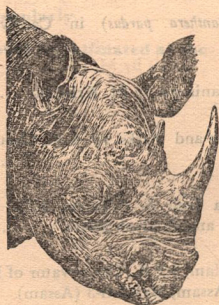
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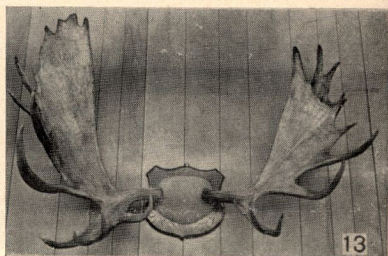
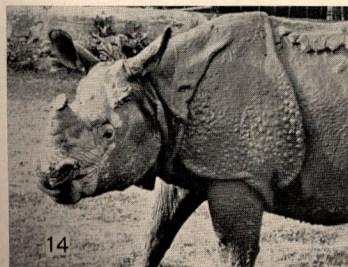
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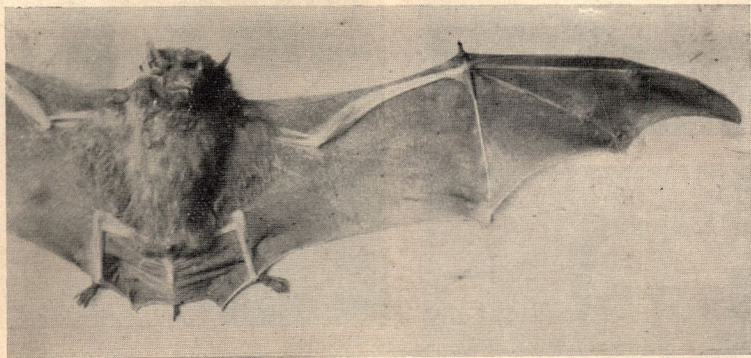


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A remarkable Indian Tomb Bat. (See Page 36)



Two black and one normal coloured panther cubs born in one litter to a normal coloured mother panther and black panther father on 2-8-1973. (See Page 7)

Form and Function of Horns, Antlers and Tusks

By

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Introduction

The distinction between horns and antlers, and to a lesser extent, between horns and tusks, is seldom appreciated by many. This article seeks to bring out some differences between these related, though distinct structures. Modell (1969) gave a detailed account of the differences between horns and antlers.

Regular horns are present in cattle, sheep, goats and antelopes (all being members of bovidae) as well as in rhinoceros. Antlers are present in deer, caribou, moose and elk, all belonging to cervidae. Apart from these, giraffe and okapi have each two permanent protuberances at the top of their head which are neither horns nor antlers.

Among the animals that bear tusks, elephants are the conspicuous ones. Boars have a pair or two of tusks, and may in addition, show a pair of warty excrescences as in the African wild hogs. Two prominent, downward-pointing tusks characterise the walrus. The arctic whale, narwhal, has a single, straight and forwardly-projecting tusk that can grow even ten feet long. As exceptions to the rule, the Chinese water deer and the musk deer (Fig. 1), both of antler-bearing mammals, carry tusks instead of antlers.

Horns different from Antlers

The most striking difference between horns and antlers is that the material with which horn is made of is related to skin, and that of antlers is related to bone. Generally, horns do not regenerate when destroyed from the core since such a damage destroys the essential filament secreting the epidermal tissue that form the horn. Antlers, on the other hand, are shed and regenerated almost once every year.

Horns are formed mainly by a chemical substance known as keratin which is the principal constituent of hair, nails, hooves, scales, feathers and the like. Hence horns are non-living and devoid of nerves and blood supply. So, they are insensitive to pain. Antlers, on the other hand, are living organs, especially in the early stages of development. They resemble true bones of the body in physiology, chemical composition and cellular structure. When an antler regenerates, it is enclosed in a hairy, living skin called velvet (Fig. 2) which has a rich supply of blood vessels, and so is sensitive to touch and pain. If the antler at this stage is injured, it bleeds profusely. Antlers develop into bones through the intermediate stage of cartilage. The new crop of antlers begins its appearance in April-May, and by September it attains full size. At this stage, the bone at the base

becomes denser and cuts off blood circulation to the lateral part of the antler excepting the velvet. Gradually blood supply to the velvet is also cut off and the skin dries up and peels off in streaks. Often the animal gets rid of the already peeling skin by rubbing the antler against trees or similar objects, till the bare tines of bones are exposed (Fig. 3)*. When the rut (mating season) is over by about December, the base of the antler structure gradually weakens, and this helps the eventual fall of the antlers. Due to some irritation at the base of antlers, the animals themselves try to cast off these outgrowths. Bleeding may take place as the antler breaks off from the base, but with the formation of a clot, bleeding would stop quickly and a new layer of velvet that remains dormant till the onset of spring, is formed. Thus, antlers are deciduous, while horns are not.

The two horns in an animal are bilaterally symmetric (Fig. 4), but the antlers in many deer are not strictly so due to their branching nature. Horns are unbranched whereas antlers are generally branched. Antlers are even referred to as branched horns. As a regular horn-bearer, the pronghorn (*Antilocapra americana*) (Fig. 5) is an exception. This species has an affinity to antlers because of their deciduous nature. Also exceptional cases of four horned animals (Fig. 6) or even six-horned ones are met with, as in the Loaghtan sheep (Thomas, 1972). Horns make impressive spirals as in lesser kudu (Fig. 4). The spiral of the horn on the right side of the head of the animal matches with that on the left side symmetrically bilaterally. In other cases, horns may merely, but prominently, twist as in eland (*Tragelaphus* sp.) (Fig. 7). In animals like the sable antelope (Fig. 8), horns display annular or oval ridges that may indicate the approximate age of their possessor. It may also be of interest to note that the horn on the right side of head in Marco Polo's sheep (*Ovis ammon*) (Fig. 9), etc. spiral/twist clockwise while the corresponding one in other animals such as lesser kudu and eland spiral/twist counter-clockwise. Yet another difference between horns and antlers is that both the sex in horn-bearing species possess horns while in antler-bearing species, with the exception of reindeer, only the males have the cephalic adornments.

Asymmetry of Reindeer Antlers

The reindeer (including its North American counterpart, the caribou) is an exception among deer since the females of this group also bear antlers which are not so elaborate as those of male deer. The possession of antlers by the female caribou varies regionally.

A single antler is asymmetric, though for most deer, the pair is more or less bilaterally symmetric. In the case of the reindeer, however, the antlers are nearly enantiomorphic only as far as the topmost and middle branches are concerned. The antler developing from the left or sometimes the right half of the animal's head has an extra branch or tine which gets considerably flattened and palmately branched at the fringe (Fig. 11). This branch/tine, directed downward, occupies the middle of the face

over the nose. It is a common notion that reindeer make use of this odd outgrowth of the antler for digging out snow deposit to reach the lichen buried underneath, which is the staple food of the barren ground caribou, especially during winter. Irrespective of its function, the form of the brow tine is interesting since in some individuals it is fully developed into a wing while in others, it is reduced to a simple narrow tine. In exceptional individuals, the extra outgrowth is totally wanting, or there may be two similar-sized branches, one from each antler. In some animals, the extra or larger branch develops from the left-antler and in others from the right antler (Davis, 1973; 1974; Banfield, 1961).

Of the total 211 heads of reindeer/caribou that I could examine in Alaska, Canada and Europe, the majority (58.35%) was left-dominant. It becomes increasingly clear that there is no evidence for a genetically controlled design in the morphology of reindeer antlers. Hence an explanation for it may be possible from environmental factors. The suspected non-genetical antler asymmetry could as well be influenced by geo-physical factors.

Importance of Antlers and Horns

Antlers are of little utilitarian value for the animals which possess them. They appear to serve only as decorative pieces which give some of them no doubt a noble appearance. They are often an encumbrance while the animal moves through shrubs and branches of trees. In this respect the highly branched antlers of the reindeer are worse. During the mating season one could notice occasionally pairs of powerful stags getting their antlers interlocked and perishing helplessly. Unlike horns, antlers are more delicate structures, not capable of serving as strong weapons for fighting. It is of common knowledge that when antlered animals fight, they make use of their hooves more than their antlers. Between the annual shedding and the regrowth of antlers, the deer seem to carry out their activities including fighting without antlers. The size and form of antlers of the same animal vary year after year with new crops. Until the deer reaches its full adult stage, the size of antlers increases. When the animal gets very old, the size of later formed antlers becomes smaller, and during some years they may even persist on the animal throughout.

As the antlers do not serve much useful purpose for the deer, scientists suspect that these structures help the animal in removing the bodily heat during summer, for they contain blood vessels as well as sweat glands. The huge antlers of the North American moose (Fig. 12) and its European counterpart, the elk (Fig. 13) may be more effective for such a purpose. The females are less active and stay generally in the shade, and hence such an organ is not very essential for them.

Cattle, sheep, goats and antelopes often use their horns for fighting. The rhino charging a victim and making use of its horn is well-known. Horns not only enhance the look of some animals, but most of them serve as effective weapons. Even the females of the horn-bearing species possess horns, though of a smaller and subdued size comparable to those of the males. The horns help to defend some weaker animals from their aggressors. When a horn is broken off while fighting or otherwise, it usually destroys the inner essential filament, and hence regeneration becomes impossible. Individuals carrying only a single horn, the other having been broken, are a familiar sight among cattle.

Rhinoceros Horns

Rhinoceros appeared some 40 million years ago. The great Indian rhino (*Rhinoceros unicornis*) has one permanent horn above the nose (Fig. 14), while its African cousin (*Diceros bicornis*) (Fig. 15) has two nasal horns placed one behind the other, the anterior one usually being longer than the other. The Indian rhino is now present only in the north-eastern region of India although during the Mohenjo-Daro era (about 5,000 years ago) (Seshadri, 1969), this animal roamed in the plains of the Indus river valley, the present Pakistan. Of the other two Asiatic species of rhino, the Sumatran is two-horned and the Javan rhino is one-horned. Thus, the three Asiatic and two African species (white rhino and black rhino), both two-horned constitute the only 5 species. The African white rhino is the largest; then comes the Indian species which is followed in order of size by the African black, the Javan and the Sumatran rhinos. Among the animals that bear horns or antlers, rhino is the only odd-toed animal. Horse, ass and zebra are some odd-toed animals which do not possess horns.

The horn of the rhino is not a real horn at all, but it consists of agglutinated hair or keratin fibres cemented together in a hard compact mass. Moreover, it is not fixed to the skull like the antlers which grow on pedicels, or like horns which grow on central cores of bone connected to the skull. It is epidermal and rests on the flesh and can be knocked off by a hard blow. When a horn is thus removed, another one grows after a year, an exception among horn-bearing animals.

Cow-rhino in India carries horns as large as those of bulls. The record horn of Indian rhino, as the one preserved in the British Museum, London is 24 inches, while the average horn measures about 8 inches.

Alleged Properties of Rhino Horn

Considerable medicinal properties have been attributed to the rhino horn. Like the horn of the (mythical) unicorn, rhino horn was supposed to be a good insurance against poison. The drinking cup (Fig. 16) carved out of rhino horn would split if poison was added to the contents. Another attribute was that a drink served in such a cup would

start frothing if poison had been added. Even now, rhino horns find a ready market in eastern Asia, especially China, as an alleged aphrodisiac for restoring lost manly vigour.

Another alleged property of rhino horn is that a horn placed under the bed of a woman at the time of childbirth would assist her in her labour. Persons owning a horn would rent it out to expectant mothers for money valued at £30.00 each time (Gee, 1964). Yet another belief is that a rhino horn left to soak in a filled bucket, turned the water into a sort of elixir of life.

The horn is worth half its weight in gold. In an auction at Gauhati, according to Gee (1964), the entire lot was sold at £189.00 per pound. Leakey (1969) moans that the rhinos in Africa are also in grave danger from poachers because rhino horn commands a high price in the Far East. Traders from the coast pay the equivalent of \$12.00 a pound, or sometimes more than \$150.00 for a horn. Sold in powder form, such a horn eventually commands several thousand dollars in the Orient.

However, tests conducted in laboratories have conclusively shown that rhino horn has no special biochemical or hormonal properties.

The Head Knobs of Giraffe

The giraffe and the okapi are closely related to cervidae and evolved from the same origin which is recent compared to the age of horns. The knobs on the head of these two animals are not made of keratin, and hence not true horns. The giraffe's knob (Fig. 17) is covered by hairy skin, and in the okapi, there is a small bit of horn visible at the tip. Thus, the protuberances on the head of giraffe are not at all effective weapons to attack or to defend themselves from other animals.

Because of his rich experience with East Africa's prehistoric animals, Leakey had constructed *Libytherium* (Fig. 18) or the beast from Libya from which the modern giraffe has evolved. This animal is stated to have lived through nearly all the two million years of the Pleistocene epoch. *Libytherium*, almost the size of the giraffe, but with shorter neck, had wide palmate horns which resemble the antlers of moose. According to Leakey, nobody yet knows precisely how and at what angle these structures were held on the animal's head. As visible in the picture, *Libytherium* possessed two conical warts between the eyes. The function of these is not known. Thus, the head knobs of the giraffe may be regarded as relics of the antler-like structures its ancestors carried on their heads.

History of Antlers and Horns

Horns are about 100 million years old. In the Cretaceous period, there were dinosaurs and crocodile-like reptiles with horns. *Triceratops* (Fig. 19) possessed three horns, two above the eyes and one on the nose (Colbert, 1970; Romer, 1968). These horns and other skull protuberances were used by the prehistoric animals as powerful weapons against their fellow creatures.

Among many species of bovidae and cervidae, horns and antlers developed some 25 million years ago in the Miocene epoch. However, the bovidae should be regarded as having revived the keratinous horn growth that was in existence 100 million years ago. For the cervidae, the antler is basically a new development. The first antlered cervid appears to be *Diceros* of early Miocene epoch which grew very simple antlers in the form of short spikes. In the Pleistocene epoch some of the cervids had monstrous antlers. The great stag (*Cervus megaceros*) (Fig. 20) of the Ice Age perhaps had the largest and heaviest of antlers. The pair of antlers had a spread of about 10 feet and weighed 154 lbs.

Big Game Shooting Licence

Big Game Shooting Licence under the Wild Life (Protection) Act 1972 permits sportsman to shoot the following:—

1. Andaman Wild Pig (*Sus andamanensis*).
2. Barking Deer or Muntjac (*Muntiacus muntjak*).
3. Bharal (*Pseudois nayaur nayaur*).
4. Chinkara or Indian Gazelle (*Gazella gazella bennetti*).
5. Chital (*Axis axis*).
6. Four-horned Antelope (*Tetracerus quadricornis*).
7. Gorals (*Nemorhaedus goral*, *Nemorhaedus hedgsoni*).
8. Himalayan Black Bear (*Selenarctos thibetanus*).
9. Himalayan Ibex (*Capra ibex*).
10. Himalayan Thar (*Hemitragus jemlahicus*).
11. Hog Deer (*Axis porcinus*).
12. Hyena (*Hyaena hyaena*).
13. Mouse Deer (*Tragulus meminna*).
14. Nilgai (*Boselaphus tragocamelus*).
15. Ratel (*Mellivora capensis*).
16. Sambar (*Cervus unicolor*).
17. Sloth Bear (*Melursus ursinus*).
18. Tibetan wolf (*Canis lupus*).
19. Wild Pig (*Sus scrofa cristatus*).

Breeding of Black Panther (*Panthera pardus*) in Captivity

By

L.N. ACHARJOY¹ AND R. MISRA²

An adult male Black Panther which was received from Assam State Zoo, Gauhati on 18-10-1972; was mated with two normal coloured female panthers namely "Spotty" and "Rupa" of Nandankanan Biological Park (Orissa). Both these females were caught from the forests of Phulbani district of this State when they were cubs and reared in captivity.

Birth of three normal coloured cubs was recorded on 23-7-1973 to one of the females "Spotty". The second female "Rupa" gave birth to two black panther cubs (1 male and 1 female) and one normal coloured male cub in one litter on 2-8-1973. The spots in the black panther cubs though obscure, were still visible on close observation in good light as in adult black panther. The black panther cubs weighed 587 grams and 550 grams and measured 43 cm. and 44 cm. from tip to tip including 15 cm. long tail at birth. The normal coloured cubs of this litter weighed 603 grams and measured 45 cm. long tail at birth. The mother was jealously guarding all the three cubs. The cubs were seen taking beef alongwith the mother from the seventh week onwards. The growth rate of these three cubs, to the age of 3 months was recorded as follows:—

Date	Black male	Black female	Normal coloured male
1	2	3	4
2-8-73 (birth weight)	0.587 kg.	0.550 kg.	0.603 kg.
9-8-73	0.857 kg.	0.910 kg.	1.065 kg.

(Contd.)

1. Veterinary Assistant, Surgeon, Nandankanan Biological Park, P.O. Barang, Dist: Cuttack.
2. Wild Life Conservation Officer, Orissa, Cuttack-1.

1	2	3	4
16-8-73	0.980 kg.	1.223 kg.	1.410 kg.
23-8-73	1.250 kg.	1.500 kg.	1.720 kg.
30-8-73	1.400 kg.	1.700 kg.	1.850 kg.
6-9-73	1.600 kg.	1.800 kg.	2.000 kg.
13-9-73	2.000 kg.	2.000 kg.	2.400 kg.
20-9-73	2.400 kg.	2.300 kg.	2.700 kg.
27-9-73	2.500 kg.	2.400 kg.	2.800 kg.
4-10-73	2.600 kg.	2.700 kg.	3.100 kg.
11-10-73	3.000 kg.	3.200 kg.	3.500 kg.
18-10-73	3.400 kg.	3.700 kg.	4.000 kg.
25-10-73	3.900 kg.	4.100 kg.	4.400 kg.
1-11-73	4.400 kg.	4.600 kg.	4.800 kg.

The black panther cubs were more cunning and bad tempered than the normal coloured cub.

A black panther cub born in one litter to the female of a pair of black panthers of New York Zoological Park measured 14" from tip to tip and weighed 20 ounces at birth (Crandall, 1965). The average weight of fourteen normal coloured panther cubs was 0.518 kg. and the average length from tip to tip was 45 cm. including the average tail length of 15.1 cm. (Acharjyo and Misra, 1972). Pocock (1930) states that black individual are found with some frequency in parts of the Asiatic region but are rare, though not unknown, in Africa. According to Blanford (1888-91) both normally coloured and melanistic examples are said to occur in the same litter in nature. Crandall (*loc. cit.*) states that in his own experience, captive pairs in which both animals were black have produced only black young and no black young have been born to spotted parents. Crandall (*loc. cit.*) further states that late Axel Reventlow once told him that a pair of leopards in the Zoological Gardens of Copenhagen, one spotted, the other black, bred cubs of both colour phases. A photograph of one normal coloured and one black cub

of a normal coloured mother panther (the father may have been black) has appeared in between pages 48-49 of E.P. Gee's (1964) book "The wild life of India".

Acknowledgement

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Tiger Census

The first ever tiger count in India taken by a scientific method in 1972 revealed the following estimate of Tiger population:—

State	Number	State	Number
Andhra Pradesh	... 35	Mizoram	(not counted)
Arunachal Pradesh	... 69	Mysore	... 102
Assam	... 147	Nagaland	... 80
Bihar	... 85	Orissa	... 142
Goa	... —	Rajasthan	... 74
Gujrat	... 08	Tamil Nadu	... 33
Haryana	... —	Tripura	... 07
Kerala	... 60	Uttar Pradesh	... 262
Manipur	... 01	West Bengal	... 73
Madhya Pradesh	... 457	(excluding 4/5 of Sunderbans area)	
Meghalaya	... 32	Total	1827
Maharashtra	... 160		

Communication among the higher animals

Fourth and final instalment of a Series

Olfactory and other Communications—4

M. KRISHNAN

We know little of the colour-blind world of smells in which most animals live. We can identify a few strong smells by nose, the acrid smoke of pipe tobacco and sulphurous fumes, the reek of ammonia, a few stinks and few heady scents, fruit smells and fish smells, and the odours of decay and mustiness. It is only in association with the sense of taste that our olfactory perceptions acquire any delicacy—and even then the flavours we prefer are usually not delicate but powerfully pervasive, the smell of onion and garlic, asafoetida and vanilla essence.

Even in the most advanced animals, olfactory perceptions are of supreme importance. We know one another largely by sight and occasionally by voice, but most animals are well able to identify their associates and intimates by body smells. Moreover, our capacity to know our environment, and those that intrude into that environment, through subtle or weak airborne smells is practically undeveloped, and our apprehension of ground-scents is nonexistent. Furthermore, among animals several powerful urges and responses (such as sexual urges and mother love) are stimulated and largely governed through olfactory perceptions, as they are not in our lives.

Many animals have special scent-glands which serve to leave behind a scent track, where they have passed or rested or rubbed themselves against something, or otherwise marked scent-flags. Sheep have such glands on the face, and in the groins and feet, and goats (in addition to a strong, goaty skin odour) usually in their feet; goat-antelopes may have such glands both on the face and feet, and antelopes have infraorbital glands (which can be everted) and also glands between their hooves; most deer have infraorbital glands and also foot-glands. All these are social or gregarious animals.

Even normally solitary animals, like the civets and mongooses, and animals of the ferret and badger families, are powerfully endowed with smelly glands, with anal stink-glands—the American skunk is universally notorious for its power to squirt out a cloud of overpowering stench in defence, but many other animals also possess similar stink-glands. Even dogs and cats have subcaudal glands that secrete a strong-smelling fluid.

The normal purpose of the many kinds of scent glands that we find in so many unrelated mammals, so differently situated anatomically, seems to be to mark territory or to leave behind a trail. Where the glands are in the feet (usually between the hooves) they leave a scent-trail in the wake of the animal as it walks on, and where they are in

the groins, they mark the ground beneath when the animal lies down for a rest. Facial glands are rubbed on some convenient surface, such as a rock or tree trunk—deer may be seen rubbing their everted infraorbital glands on low branches or on the boles of trees.

Tigers, leopards and cats squirt the foetid secretion from their subcaudal glands on to posts and tree trunks and similar prominent landmarks, to mark territory and to leave behind scent-flags. Even animals that do not possess special scent glands for this purpose are able to do the same thing by utilising everyday bodily excretions, such as faeces and urine. The dung heaps frequented by animals like the rhinoceros and the nilgai are thought to serve a social purpose, and the use of urine to mark territory by dogs is something that everyone knows.

The use of stink glands as a defensive mechanism, as by skunk, ratelss, civets and mongooses, is a different application altogether of strong-smelling glandular secretions. One of the most familiar little creatures that come into our homes, the musk-shrew (usually miscalled 'musk rate' in India) also emits a powerful stench from bodily glands under provocation. The refined extracts of some potent secretions were popular with us, as scents, not so long ago—for example, civet and musk. We need not consider the use of stink-glands as weapons of defence, for repulsion rather than communication—though a stink-bomb, too can be a most pointed and effective communication.

Even among animals that live in herds, like gaur, blackbuck and some kinds of deer a male becomes aware of a female in the herd coming into season entirely through olfactory perception. In other animals, living more or less by themselves, such as the greater cats, jackals and dhole, and even the elephant on occasion, mate location may involve a long following up of a female in heat by scent. Considering that such animals cannot clearly see their prospective mates from afar, and know that the female is in season, the superior effectiveness of advertisement of the condition by smell (which can permeate ground cover) will be obvious, and the importance of olfactory perception in locating the female in breeding condition, and in stimulating the male sexually, to the survival of the species, will also be evident.

Among the herbivores, food location is also guided largely by smell—even some animals that live on an omnivorous diet including insects and small fry, are guided in their keen then search for food noses. Bears smell out subterranean prey (such as grubs and termites), and also know by their noses when a forest tree or bush is rewardingly in fruit. Domesticated pig are used in Europe to locate truffles, and wild pig go mainly by their sensitive noses in discovering the underground tubers and corms, and funguses, on which they live so largely. Even the smell of some specially fancied foliage may serve to draw the attention of a herbivore to it. Once, I was riding an old, totally blind cow elephant along a forest path, and from

time to time she would leave the path, disobeying the mahout, to guzzle the tender shoots of a species of *Diospyros* growing along the way, from 10 to 40 feet from our path.

Airborne scents are of primary importance to many mammals. Gaur, sambar, pig and similar forest-living animals depend even more on their noses than on their ears to warn them of lurking or approaching danger. In this, undoubtedly they are much helped by their habits of grazing and browsing strung out, and of turning and doubling back on their tracks periodically, for the wind is never steady or strong in the forest, and some shift in the wind betrays the danger to one of the herd, which instantly sounds the alarm.

Chital grazing in the open can scent a predator from a mile away, wind being right—sight would not be of much use at such a distance. Elephant and gaur, too, have exquisite noses, but sambar and pig, while they possess excellent olfactory powers, are comparatively somewhat near-scented, no doubt because they live mainly in forest cover.

In the first part of this series, as well as earlier in this part, the remarkable ability of some animals to follow ground-scents both while hunting and while following other members of their herd has been mentioned, as also the presence of special scent glands and the utilisation of their secretion, and bodily excretions, to mark trails. What is much more remarkable is that some animals can follow a trail which has not been specially marked by the animal that laid the trail, going entirely by their extraordinary ability to follow the contact of the feet with the ground, entirely by nose. Police dogs, of course, are the most familiar examples of animals with such abilities. They follow the fresh trail of a man on foot, solely by getting his personal body scent from some article of clothing known to have been worn by him, or by the smell of his footwear. Elephants, too, have this remarkable ability to follow faint ground scents. They follow other elephants (which have no foot-glands) by smell, and also, as I know to my mortification, can track a man by his footprints in the face of a stiff breeze!

Tactile perceptions have been reserved to the last because they are probably the least appreciated of the senses, even among us. Blunt as our fingers are, if we use them, and train them, they can tell us the difference between the thickness of two sheets of paper, one of which is 1/10 millimetre thicker than the other, entirely by touch.

As already detailed, special tactile organs like vibrissae are developed in some animals. Lacking sensitive fingers, some of them use the naked tips of their noses to feel with and sometimes their tongue; nuzzling, noticeable in mother-young relationships and in courting, may involve the use of both nose and tongue, and using the nose to feel with, it could be the sense of smell is also invoked.

Bodily contact is often resorted to when animals wish to express a friendly intent;

cats rub against one's legs, purring, and dogs nuzzle and lick men in a display of affection; reassurance may also be the motive behind a group of animals huddling together when facing a threat.

Affection and deep attachments are also expressed, and understood, through close bodily contacts. Many animals caress their mates during courtship—elephants, gaur and dolphins exemplify some of the many kinds of bodily contacts used among animals in love-play. The mother-young relationship (the deepest attachment known to animals) involves lengthy periods of intimate bodily contact.

In our preoccupation with physical responses and stimuli, we are apt to overlook the very real communication of reassurance or comfort that bodily contacts can bring to animals. Instead of detailing these psychological communications, I shall end this series with a brief account of an actual personal experience.

One night, long ago, a mortally wounded pig-hunting dog was brought to me, for such aid as I could give it. The thorax had been gashed open by the tusk of a big wild boar, a deep, clean cut through the rib-cage extending from the neck to the abdomen, slashing the lung. Great masses of frothy blood covered the gaping wound, and the animal was breathing in rasping gasps, for the blood clots blocked the mouth and nostrils.

There was no hope, and I offered to put a quick end to his sufferings, but the Boya who had brought him to me begged of me not to do so. I cleaned the mouth and nostrils, put him down on a padded sack and elevated his head with a cushion beneath, to prevent the blood blocking his nose. He wagged his tail feebly in acknowledgement of these attentions, and his breathing grew less laboured and then ceased to be stertorous; I was sitting on a stool close by, and he shifted his head on to my feet from the cushion. All night long I sat up with that dying animal, who insisted on pillowing his head on my feet. When, unable to bear the cramps, I shifted his head back to the cushion, he whined piteously and I had to let him have his way—he made no other fuss or demand. He died just before dawn, with his head still on my feet, and along with the great relief I felt at the end of his sufferings, I also realised how much the mere contact with sympathetic flesh meant to an animal, even when grievously wounded and with life ebbing.

Maintenance of Wildlife Sanctuaries and Parks

By

S.R. CHAUDHURI I.F.S.

Summary

A summary of diagnosis on objectives, concepts, applications and defects is given in para 9 (pp 12 to 14).

Suggestions for maintenance of wildlife sanctuaries and parks are broadly of two categories:

A. Discrete use strategy according to variable systemic records in the total complex of ecosystems in the range under treatment. No area is to be kept out of use and out of sight. Required data and data processing are as follows:

AA. Range inventory.

BB. Spatiotemporal measurements of structure and function.

(i) Evolution of simple broad pattern methodologies.

(ii) Refinement through experience.

(iii) Application or adaptation of existing techniques.

CC. Inferences from data in AAA and ABB.

(i) Interrelationship of structure and function with variable factors and influences.

(ii) Role of the local man.

(iii) Response to treatment.

DD. Projections:

(i) Reorientation of approach towards the maintenance of wildlife sanctuaries and parks.

(ii) Co-ordination of forestry and wildlife conservation.

(iii) Integration of the local man and his domesticated live stock into the total system.

EE. Primary need to achieve the above is emphasised on proper and speedy education both at professional and technical levels.

B. Action proposals on remedial measures for some obvious defects.

AA. Prevention of decimation through human agency.

(i) Poisoning.

(ii) Traps.

(iii) Bows and arrows.

(iv) Firearms.

BB. Improvement of limiting factors like

(i) Water, (ii) salt and (iii) cover.

CC. Control of diseases.

The paper ends with a warning against distortion of bio-aesthetics by construction of unnatural looking structures.

0. Role of the state:

Wildlife sanctuaries and parks are natural areas maintained by the state to conserve irreplaceable elements of landscape and biota. In India we have many such invaluable natural assets represented by areas of unusual scenic beauty, natural habitats and specific plants and animals or their communities. Some of these have been recognised. Others are yet to be explored. Conservation of these resources is the duty of the state and their maintenance a public trust, that they may be available to the future generations.

1. Principles and practices:

1.1. Method of conservation varies with the resource involved and the purpose for which it is conserved. Maintenance compliments conservation, its nature determined by the method applied. Conservation of a rocky region of unusual scenic beauty may require only the prohibition of all consumptive use. Its maintenance would hence need appropriate preventive measures and the regulation of its nonconsumptive use. The conservation of a rare and threatened species, on the other hand, may need stringent legal protection combined with careful manipulation of the environ and the population. Its maintenance, therefore, would demand adequate protective measures combined with the highest degree of scientific management of the habitat and the population. These are instances of specific conservation objectives, generally included in a wider spectrum of expanded view over larger complexes of natural areas. The latter, by and large, is the general feature of wildlife sanctuaries and parks in our country.

1.2. It should envisage a total ecosystem concept of conservation often with specific bias favouring the structural components in animals and their distribution in space. Because various communities of animals are related, like in plants, to specific ranges of successional stages in a sere, maintenance of natural areas under the ecosystem concept involves the regulation of the interactions between the standing state and the standing crop and those within the biota to perpetuate the ecosystem at a desired stage of ecological succession—early or mid-succession, sub or disclimax—or allow it to stabilise at the climatic climax.

1.3. In a climatic climax the biotic communities have a limited range of species adapted to hold their own against natural replacement. The ruling climatic climax in our country has a structural composition of dense tree stands with more of aboreal animals and less of terrestrial forms. Its look is said to be primordial, its principal role, that of a natural monument. It has objective comparison value too between the natural biota under human influence and that without, on the same land. It may perhaps provide insurance against the disappearance of specific organisms that may thrive only in such climax formations. In miniature such an area in forestry is the preservation plot.

2. Comparative role of people's influence:

2.1. In affluent countries this type of natural areas rate high in economic significance. They have rising market values for their nonconsumptive use, the relaxation and recreation they offer for the growing tension of the city life. The average citizen there has the leisure and facility to accept the offer. He has the extra fund to pay for the use. This natural area with the lure of its primordial look earns its own maintenance. And in addition, it yields a substantial surplus rental, often much more than the combined potential of all other kinds of possible consumptive use of the standing crop. Adverent projection of such results confirm the basic concept that allows here total freedom to nature, eliminates consumptive use and regulates nonconsumptive use, much the same way like with the bare rocks of unusual beauty.

2.2. The Grand Teton National Park near the famous Yellow stone National Park in the States, covers a natural area of 650 Sq. kms. It draws annual total of over three million visitors who pay for their fare and otherwise too for the enjoyment of its pristine beauty. The resultant annual circulation in dollars runs to hundreds of millions with attendant support to many kinds of industries and other avenues for employment. To foster the visitors' emotional relation with pristine nature, any structural or functional manipulation necessary for the health of its climax ecosystem is done subtly away from the visitors' view or in a way that would not give cause to any resentment which may devalue the bio-aesthetics. Forest fire is strategically used as a tool for controlling defoliators. Annual take in meat from winter culling is tactfully distributed free to the schools and hospitals. The people appreciate such tacit gestures. Maintenance of Grand Teton is thus a direct function of the level of the users' interest, and protection a direct issue of that interest.

2.3. In India, one of the leading among similar wildlife parks is the Periyar Sanctuary in Kerala. Of its 650 Sq. kms. only 50 Sq. kms. of the lake and the surrounding hill slopes are under nonconsumptive use. Total number of annual visitors ranges between sixty to seventy thousands, highest for any in India. The area used gets maximum attention. The rest, beyond the view of the visitors, remains neglected, and poaching there is untrammelled. Sex structures in elephant population show heavy decline in tuskers. Ivory industry continues to thrive in the neighbourhood of Periyar. Tuskers are apparently the main targets. Behavioural association with the areas used by the visitors promotes influx

from the outlying regions under conflicting human influence into the safety of the lake surround. Influx increases adverse effect on the intertrophic resource status. Stress conditions near the lake are apparent in the range symptoms of the numerous diamond pattern game (grazing) trails on the open hill slopes and the weak health of the populations. Elephants (*Elephas maximus*) are affected the most for they have to compete with the better equipped wild pigs (*Sus cristatus*) for the same food, the rhizomes.

2.4. Like with the Grand Teton, maintenance of the climatic climax is the guiding concept in Periyar. In the former it is a great success. In the latter it is grim failure. The sharp differential happenings reflect the pivotal role of the socio-economic and socio-political influences of the people. Formulation of any conservation concept for natural areas, therefore, should necessarily have objective alignment with the quality and trend of the educated behaviour of the people who must participate in the future maintenance of such areas. Sadly enough we have not done it.

3. Unrealistic projections:

3.1. We visualise the future of our wildlife sanctuaries and parks rather wishfully in the conceptual projection of the happenings in similar areas in the States and the East African countries. The projection, however, is not sized to the factors and influences that obtain in our land. Such projections are unrealistic.

3.2. In North America it is the pristine nature which is cherished and nurtured by the people. Wild animals are interesting, not essential.

3.3. In East African countries it is the exciting experience with the numerous wild animals of many varieties seen far and wide over the expanse of the open savannas that draws the dollars. Through centuries the animals there have arrested the ecosystem at the savanna stage. In recent times, rigid protection in some had led to overpopulation with consequent depletion of range conditions. To-day the manager there has learnt the wiser ways of manipulating the populations even in the National Parks without causing any change in their behavioural response to the visitors. And his wisened practice earns quadrilateral benefits: the optimal maintenance of habitat conditions, perpetuation of the desired species structure, harvest of surplus protein and increase in bio-aesthetic values.

3.4. We expect that our wildlife sanctuaries and parks should have climax forms like in the States and also present plentiful animals like in the East African countries. The two are mutually eliminating in their seral interrelationship on our land. And yet, to foster the former all consumptive uses are urged to be eliminated, and to simulate the latter, pockets of artificial inducement is resorted to often creating endemic conditions and generating unnatural behaviours in a natural setting. The former gates all self-generated economic support. The latter gapes for increasing financial import with resultant rise in fiscal burden and fall in commensurate benefits both economic and ecologic. Objectives are indefinite in achievements because the structure and function are not measured. Response to treatment are thus largely indeterminated but defects often apparent.

4. Defects in the structure and function, their causes and the effects:

The usual defect is the major functional often structural changes that take place in the interrelated areas under use and those unused.

4.1. Of Periyar (Kerala) I have already mentioned the defects.

4.2. In Kanha (M.P.) with the threatened subspecies, Barasingha, 12 meadows of total around 2000 hectares are the main pockets of heavy population influx. The added reasons for the influx and the results thereof are as follows.

4.2.1. Increase in the congestion of the high quality sal forests about 7000 hectares which enclose the meadows. Suspension of fellings has caused the congestion. The denser tree stands have proceeded into the successional stage which is not related to the communities with cheetal (*Axis axis*) and barasingha (*Cervus duvauceli brandari*).

4.2.2. The influx gets added induction by the artificial saltlicks and in some, feeding stations provided in the meadows.

4.2.3. The results are:

A. the meadows appear overused;

B. the weaker barasingha population is facing detrimental competition from the more vigorous and numerous cheetals, and

C. the state is losing annual income of over ten lakhs of rupees from the sal forests for no corresponding gain otherwise, but actual loss in the crucial range properties in habitat and structural interspersion.

4.3. Corbett in U.P. has similar features like Kanha, Dikhala is the crowded campus, Khinanauli chaur its surround of alluvial grass land under nonconsumptive use. Periphery of the grass land is dense sal forests of high quality. Fellings in these sal have been suspended recently with an annual loss of Rs. 16,00,000/-. The symptoms of malformation and malfunction are stated below.

4.3.1. Objective sampling of pellet groups by my students in 1971 showed sharp fall in the density of deer in areas outside the influence of the tourist campus in Dikhala chaur. Relative frequency and abundance ratings corroborated the estimate.

4.3.2. Measurements in the chaur (Spillet, 1968) revealed heavy overuse at the edge. Cheetal and para (*Axis procinus*) are seen here in large herds.

4.3.3. Frequent evidences of different tigers around the chaur give suspicion to intraspecies stress. Territorial tension is apparently high because two dead tigers with smashed skulls, one partly eaten, were found in the periphery of the chaur in June and December 1968-69—killed in fight. Imbalanced niche distribution was the evidents cause.

4.4. Kaziranga (Assam) famous for its Great one horned rhino (*Rhinoceros unicornis*) has bulk of its important wildlife populations concentrated in the Bagudi block at the

western end. In 1966 this block had rhinos 3 times denser in population than in the rest of the sanctuary. By 1972 the density rose to 4 times, clearly an imbalanced structural distribution. Evidences indicate that in western Kaziranga the ecological succession has been suitably arrested by biotic factors, particularly the annual use of fire. And, in addition it gets more frequent attention because of intensive nonconsumptive use.

4.5. Sariska (Rajasthan): In 1970 overpopulation of Sambars (*Cervus unicolor*) and nilgai (*Boselaphus tragocamelus*) in the area under nonconsumptive use was estimated and hazards of epidemics predicted by this author. In 1971 about 1500 sambars and a number of nilgai died of hemorrhagic septicaemia. This natural culling relieved population pressure. Scrub grows denser and less suitable for nilgai. It is seen much less to-day.

4.6. At Bandipur (Mysore) the cheetals of the neighbouring forests in the sanctuary move every night into the tourist campus. The campus apparently provides better security against nocturnal predators. The nonchalant behaviour of these wild cheetals near the busy electrified camps looks impressive but not a healthy range symptom.

5. Defects in artificial ingestive inducements:

Provision of food and other necessities artificially is often misconceived and misplaced. Contrary to expectation they may actually dampen the range dynamics by creating endemic conditions or behavioural and functional deviations.

5.1. Endemic conditions:

5.1.1. Salt-licks made on flat ground soon get infected with pathogenic excreta of diseased animals, particularly with endoparasites. Level of endemic conditions increases. Many healthy animals get infected beyond natural tolerance limits. And yet, such are the usual types provided in many of our wildlife sanctuaries and parks.

5.1.2. A stagnant water-hole placed in wide masonry or concrete saucer or with impervious approaches which drain into its pool is susceptible to become highly endemic. Unfortunately, often this is how we make it.

5.2. Behavioural and functional deviations:

5.2.1. Dispersal and interspersal of the primary consumers are the desired structural distribution for optimal range function. Regular artificial feeding of highly palatable food centripets a population or community of primary consumers towards the feeding stations. Overcrowding within the cruising radii from the feeding stations creates local stress conditions. Elsewhere the trophic resources remain largely unused. It happens in some of our sanctuaries. The conditioned populations are wrongly stated to be good for show. It is wrong because the show does not recoup the investment and behaviour conditioning disturbs proper range use.

5.2.2. In some of our wildlife sanctuaries and parks large cats are conditioned to repeated supply of live baits. In the case of lions, prides of conditioned show-lions are

located and offered the bait. Tigers and panthers are given live baits at fixed stakes. In due course the conditioned cats lose their predation efficiency. Cubs growing up with such inefficient adults get much less opportunities to learn the techniques of capturing natural prey. The predator becomes less and less effective in its important role in the total range function. But worse still, the behavioural aberration of such conditioned cats ultimately reaches a stage when the awful sight of slow dismembering of the live animals which may take hours to die, becomes the most gruesome sight for the audience. Ultimately the range loses its efficiency in the cats and the cats lose the respect of the audience. Either way the practice does not bring any benefit.

6. Defect due to lack of confidence in population manipulation:

Such managerial defect takes root in the deficiency in understanding population properties and their behavioural interactions with the environ.

6.1. The case of sambars in Sariska (4.1.5.) has been already cited. Nearabout a lakh kilograms of denison—animals worth Rs. 4,00,000 on the hoof—were lost to nature. The tigers were bait conditioned. The manager did not take up the tiger's function. It happened exactly what would have happened in some of the sanctuaries and parks in the East African countries but for the intervention of the manager there. He intervened with knowledgeable objective culling by using silenced weapons for antelopes and gazelles, and for elephants, killing doses of suitable tranquilisers harmless in consumable meat. The populations are stabilised at the optimal carrying capacity of the range.

6.2. One of the contributing conditions for the last epidemics of reinderpest in Bandipur-Mudumalai was the heavy density in gaurs (*Bos gaurus*). Enquiry reveals that before the main epidemic gaurs were seen everywhere—the relative frequency and abundance ratings were high, similar to the estimate (Choudhury *et al.* 1970) for Sariska sambars. The infection could naturally spread faster to epidemic proportion.

6.3. In 1970, except for elephants, the Chila-Khara forest of Lansdowne Division in U.P. had an optimal range condition with co-ordinated interrelationship between wild ungulates and the gujar (grazier) cattle. With the receding rains every year came the cattle to condition the coarse grass for the deer. The cattle also shared their lopped fodder with the deer. In summer the gujar left the range to the wild ungulates. Turnover in both stock and wild ungulates was high. The range tolerated the total pressure. The department controlled the cattle density. The hunters and the tigers took the consumable turnover in wild ungulates. There were 9 tigers in 200 sq. kms. of the range. Cover conditions were adequate. For three years prior to 1970 there had been no case of cattle-lifting. After 1969 there was no legal shooting of tigers. By 1972 many gujars uprooted from the large scale eucalyptus plantations came into this range. A number of gujars continued to occupy the range in summer. By late 1972 stress conditions were apparent. The range opened out fast. Elephants took more to grass and sishum of low palatable order. Structural changes took place. Nilgai occupied the opened out

chéetal habitats. The tiger was hampered. It started mispredating on valuable milch-cattle. By early 1973 four tigers (1 male and 3 females) with three cubs vanished, evidently due to their rising conflict with the gujar. Heavy increase in ungulate populations, both domestic and wild, is causing severe trampling. The unstable Siwalik formation is crumpling. The range is visibly depleting fast.....A sizeable portion of this range has been declared as a sanctuary hopefully to remove the cattle. It will not, however, reestablish the potential range dynamics. Total elimination of the commensalistic function of the cattle is contraindicated. The remedy lies in the integrated application of heavy culling in wild ungulates, reduction in the number of elephants, and regulated use by cattle. Our present view on sanctuaries does not provide for such remedies.

6.4. A little over two decades back elephants were rare in the Betla forests of Palamau National Park in Bihar. To-day they are a problem. In their relationship with human beings they have passed the stage of behavioural conflict situations. To-day there are no mosaic movements, no ambivalent response, no compromise behaviour. Evidences of redirected responses are seen in the crushed bamboo clumps and trampled teak poles. Direct agonistic responses are not uncommon. The D.F.O.'s car and that of a tourist, parked near the canteen at Betla, were badly damaged by a makhna in broad day light. After venting out his anger on the cars he walked off with a bloody trunk and disdain in his eyes for the awestricken human spectators. Once a bus was held up by an elephant and its front side hammered. For three hours (11 P.M. to 2 A.M.) two makhnas took turn in kicking a buffalo bait killed by the tiger near a watch tower. The worst came in April, 1972, when a local man was grabbed on a forest road near Betla and deliberately pealed to pieces and broken to bits. Dismembered remains of that human being lay scattered far and wide, his skull smashed to smithereens. The stimulus response interrelationship between human beings and elephants has evidently changed in the latter from defensive to aggressive. It has been allowed to change. Gain in courage against human beings is a protracted process through time, even in man-eaters. Successful display of courage may encourage others in a herd. In elephants, such behavioural aberrations lead to dire consequences. When positive action is no more avoidable the remedy to reestablish normalcy involves severe drastic steps. We hesitate to take less severe action earlier because honestly we do not know what we should do about animals in controlling the population and their environ, and so we are hesitant even with the obvious.

6.5. One of the important wildlife species in the Similipal hills in North Orissa is the greater hill myna (*Gracula religiosa peninsularis*). It rates tompost in the American market for pets, and is popular in the U.K., the continent and Japan too. Similipal is one of its main breeding range. It is an omnivore leaning heavily on animal protein (insects, lizards etc.) during breeding season. Estimates from Calcutta market (per com. Bertram 1967) revealed an annual unauthorised supply of 4000 gapers of this bird from the Similipal hills. Regulation of authorised collection was started departmentally by this author in 1967. By 1969 the work was in full swing. The local collectors received high wage of

Rs. 15/- per fledgeling. The department got Rs. 36/- gross and Rs. 15/- net per bird. Profits were high. And so, collection and pen rearing of nestlings were intensified. The local rearers released the parents from much of the fledging time. Robbed of the young nestlings and freed from fledging them the pair bred soon again. About two more cultches were thus produced by them than what they used to bring up in free nature. The annual increased yeild per den was estimated to be 8 nestlings, a net rental of Rs. 100/- per den, which would capitalise at N.S.C. rates to Rs. 60,000/- in 150 years of sal forests. Pen rearing was empirical with nestling mortality relatively high. In spite of increase in the production of nestlings, net rental per den did not increase because science did not season empirism. There was no silvicultural rethinking on the felling of trees with nesting dens nor attempts made when such trees were felled, to take out the portion with the nesting den and fix it to a nearby tree. Better ways of rearing were not explored.

Authorised and unauthorised supply to the market continued to linger at a total of 4000 to 5000. Recently a ban has been imposed on the import of hill myna into the States. Instead of the expected fall, the export rate has gone up to 8 dollars per bird. They are sent to Japan.....Says the so called naturalist, "Similipal is a sanctuary. Lez ve the hill myna to nature. Don't manipulate its population. Don't be greedy". He of course is impressive on people's emotions, stupid though his inference be on scientific biological phenomenon. He does not know that apopulation of this ecologically efficient bird should be fostered to increase, by objective management, to take its synecological share in controlling insects and be usefully occupied in the strategy for better resource utilisation. He does not know that it is necessary for the health of the sanctuary. He is, nevertheless, able to put out of focus the scientific rationales of the future view, even of the educated manager.

(Continued)

Revised Synopsis of Birds of Dehra Dun & Adjacent Hills Pt.-III (Passeriformes)

By

R.K. BHATNAGAR AND PRADEEP MISRA

Continued from Vol. 14 No. 4

Summary

This part of the Synopsis records a total of 14 Passeriform species from Dehra Dun and the adjacent Hills.

Order Passeriformes**Family Eurylaimidae**

214. **Psarisomus delhousiae dalhousiae** (Jameson): Longtailed Broadbill

FBI 3/1335; SYN 257/865; HB

'...found in the lower hills upto about 5,000. It has been nr. Mussoorie where however it is not common' (O).

Family Pittidae

215. **Pitta brachyura brachura** (Linn.): Indian Pitta

FBI 3/1323; SYN 258/867 & HB

'Essentially a forest bird. A summer visitor to the whole Dun and specially the Siwalik Sal forests where it arrives early in May. It is also found in Dehra in thick covers. Colouration: brilliant-rump, upper tail coverts and crimson under tail coverts. Call: loud in 4-notes which may be syllabilized as:—

u u = —
"We - - eet - - pe - - you" (O).

Family Alaudidae

216. **Mirafra javanica cantellans** Blyth: signing Bush Lark

FIB 3/1229; SYN 260/872 & HB

'Found in the open cultivated and fallow land in the Dun but not common' (O).

217. **Mirafra erythroptera sindiana** Ticehurst: Redwinged Bush Lark

FBI 3/1235; SYN 260/875 & HB

Doubtful occurrence.

218. **Mirafra assamica assamica** Horsfield: Bush Lark

FBI SYN; 260/873 & HB

Might be occurring in Garhwal Hills bordering Kumaon.

219. **Eremopteryx grisea** (Scopoli): Ashycrowned Finch Lark or Black bellied Finch Lark

FBI 3/1245; SYN 261/878 & HB

Occurs in the Dun but is not common as in more arid plains south of Siwaliks—dry wastelands or in fallow lands (O); New scarcely seen in Forest area—resident, one male in garden on June/Sept., 52 (G, 57); Very scarce & low (1) appearance only in Sept. at ripening crops. Appears vagrant (w).

220. **Galerida cristata chendooia** (Franklin): Crested Lark

HBI 3/1237; SYN 297/899 & HB

'Occurs in the Dun but is not common, found in open waste lands, chiefly in

western Dun (O); in New Forest area—resident (g, 57); earliest appearance in June (ploughing sowing & break of rains), latest appearance in January (irrigation of wheat) & appearance in no other time (W).

221. ***Alauda arvensis duecivox*** Brook: Skylark

FBI 3/1211, SYN 266/903 & HB

A common winter visitor to the Dun & plains of India. Found in flocks on cultivated fields (O).

Add Ripley (1961): New Forest area—winter visitor—grounds in cultivated fields (G).

222. ***Alauda gulgula***—2 Franklin: Eastern Skylark

FBI 3/1215; SYN 269/904-5 & HB

'A resident bird in the Dun but not very common' (O).

Family Hirundinidae

223. ***Riparia plaudicola chinensis*** (J.E. Gray): Plain Sand Martin

FBI 3/1148; SYN 271/912 & HB

'Common along the Jamuna & the Ganges in the Dun and breeds in colonies (O); Add Ripley (1961); year around appearance but fairly low average counts throughout & highest being 11 in Oct. (W).

223-A. ***Hirundo rustica rustica*** Linn. Swallow

FEI 3/ ; SYN 273/916 & HB

Open country & nesting in buildings from plains to the Himalyas.

224. ***Hirundo rupestris*** Scopoli: Crag Martin

FBI 3/1149; SYN 272/913 & HB

Common in the hills beyond Chakrata, in winters at moderate elevations—about 8,000, & lower. In summers they probably go to great elevations to breed (O); New Forest area; earliest seen in January, hawking winged insects nr. large buildings (G); very scarce appearance—one record, ave. count in March (W). This appears a straggler.

225. ***Hirundo concolor concolor*** Sykes: Dusky Crag Martin

FBI 3/1150; SYN 272/914 & HB

'Not common in the Dehra, in the rains, where they breed in verandhas of bungalows (O); New Forest area; resident (G);

226. ***Hirundo rustica rustica*** (Linn.): Swallow

FBI 3/1152; SYN 273/916 & HB

'Not commonly seen in the Dun—in winters specially in neighbourhood of the Jamuna & Ganges rivers. Breeds occasionally in bungalows & verandhas in Chakrata & possibly also in Mussoorie (O).

227. **Hirundo smithii filifera** Stephens: Wiretailed Swallow
 FBI 3/1157; SYN 274/921 & HB
 'A fairly common summer visitor to the Dun, common in & around Dehra' (O); New Forest area: summer visitant (G); latest seen till Nov. (G); fairly scarce & low appearance very low ave. count 1-6 from May-Oct. only (W).
228. **Hirundo fluvicola** Blyth: Indian Cliff Swallow
 FBI 3/1158; SYN 274/922 & HB
 '...breeds in large colonies—in tubular nests of mud against cliffs, occasionally nesting underneath large bridges (Hardwar) (O); New Forest area: resident (G).
229. **Hirundo daurica** Linn.: Redrumped or Striated Swallow
 FBI 3/1162; SYN 275/924-6 & HB
 '...common in the Duo in the lower hills upto atleast 6,000' (O); New Forest area: resident, partly migratory, common in winters & rare in summers (G); nearly year around appearance from March-Aug. (1-5), high ave. count between Sept.-Dec. (18-100) & low in Jan. & Feb. Highest ave. count in Nov. (W).
230. **Delichon urbica cashmeriensis** (Gould): House Martin
 FBI 3/1142; SYN 277/931 & HB
 'Breeds in colonies on cliffs at 12-13,000' near source of Tons river. In winters descends into valley below 5,000' (O).

Family Laniidae

231. **Lanius excubitor lahtora** (Sykes): Indian Grey Shrike
 FBI 2/706; SYN 276/927 & HB
 This large grey white & black shrike is rarely seen in the Dun & never in the hills, less rare south of Siwaliks (O). Add Ripley (61).
232. **Lanius vittatus vittatus** Valenciennes: Baybacked Shrike
 FBI 2/710; SYN 279/940 & HB
 Not uncommon in the Dun—in open country, grass lands with zizyphus (ber) bushes & in cultivations; recognised from *Lanius lahtora* by its bright chestnut back & white wing patch (O); appearance scarce & low ave. count (1) during May (W).
233. **Lanius tephronotus tephronotus** (Vigors): Greybacked Shrike or Tibetan Shrike
 FBI 2/716; SYN 281/945 & HB
 'Breeding from 9-15,000' wintering in plains & foothills, in gardens, semicultivation & open scrub, (Ripley in SYN).
 White (49) has observed occurrence of *Hemipus picatus*—Brownbacked Shrike; ave. count of the species are 2-7 during March & none in rest of the period. Appearance may be there in other periods too.

234. **Lanius schach erythronotus** (Vigors): Rufousbacked Shrike
FBI 2/714; SYN 281/946 & HB

This is the commonest shrike of the Dun, found all over except in the dense forest & is specially common in the cultivated & barren fields. Ascends to hills to about 6,000'. It preys upon insects as well on sickly birds & sm. animals and impales them on thorns, so as to easily dismember them. The species is wonderful mimic and may often be heard copying ten or more different bird notes with accuracy (O); appearance: fairly low throughout & max. ave. count in Sept. (W).

Family Oriolidae

235. **Oriolus oriolus kundoo** Sykes: Golden Oriole
FBI 3/953; SYN 284/953 & HB

Common in the Dun during summers, ascends to hills to about 5,000', call: fine mellow whistling call, colouration: Yellow bird as big as the thrush, wings black rest of the body yellow (O); New Forest area: summer visitant, common from April-Sept. (G); White (49) has observed appearance only during April-Sept. but low ave. count. Bird normally flies or perches on tree tops where occasionally it may nest too but seldom seen on ground level. In Dun one of the frequent area visited is in garden on Sahasdhara Road.

(Continued)

Breeding of Pigmy Hog

By

M.M. ISLAM I.F.S.

Conservator of Forests & Field Director, Tiger Project, Assam, Gauhati-3 (Assam).

In 1934, Milroy, the great protagonist in Nature Conservation in North East India remarked that Pigmy hog is "not uncommon in places, but seldom seems to be shot". But now-a-days it is very rare and till very recently believed to be extinct or on the verge of extinction. I.U.C.N. Red Data book included it as an endangered species. As the name indicates, they (adults) are very small, about 10 to 12 inches in height and very light footed. They are nocturnal in their habits.

Pigmy hog (*Sussulvanicus*) is locally known as Nal-gahori as it is generally found in undulating country where Nal (*Arundo donax*) and Ekra (*Erianthus ravanae*) are found in damp low lying areas with Khagra (*Neyrandiana reynandiana*) and Baranga (*Saccharum munja*) in adjoining high land. It is found along the foot hills of the eastern Himalayas

including parts of Bhutan and north west Assam. It is found in the wet grassy lands in so called Terai areas which are also suitable for agriculture.

With the increasing degradation and destruction of habitats due to expansion of agriculture and over-grazing, living conditions for pigmy hogs and other associated animals have become difficult. Pigmy hogs cannot migrate to a great distance in times of difficulties and are not very adaptable. They are very shy in their habits and as such rare to find, Their habitats being under constant and ever increasing encroachment it would be difficult if not impossible to stop or curtail this encroachment. Therefore it is absolutely essential that breeding colonies be set up under controlled conditions.

There are various reports as regards their presence in different localities of Assam particularly in Monas Wild Life Sanctuary and in some places of Charduar R.F. In 1970-71 a group of pigmy hogs were isolated near Barnadi Reserved Forest, and the local conservation minded Tea planters, took over the pigmy hogs immediately and began to keep them in enclosures inside their compounds to study their habits.

This has aroused considerable interest and search for further areas where pigmy hogs were sighted previously continued. Reports on the availability of pigmy hogs in area like Bhuyapara, Lotajhar and Uchila in the Monas Wild Life Sanctuary were confirmed. As they are small and nocturnal in habits it is not easy to locate them. It is reported from some parts of Cachar District also.

In the Panery T.E., in Darrang District of Assam there are at present 4 pigs, three male and one female born in captivity in 23/24th April 1973. The mother unexpectedly died on 27.4.73. The babies were brought up by the garden authority. The weight of the babies was about 50 gram each after 3 days, their eyes full open, and a full set of sharp teeth, very downy and sparse fur of pale brown grey colour.

From birth the piglets were bottle-fed with cow's milk 50 c.c. each time for all of them with ABDEC drops every two hours night and day. After about 20 days they were given farex in addition to milk and when they were about two months old, they were fed with minced beef in gravy, sweet potatoes boiled and mashed in milk, rice boild in milk or fish boild in milk. They were also given mashed up fruits like banna straw berries, mangoes, lichies etc.

After 4 weeks the piglets developed definite tan stripes and gradually became darker. Now in October 1974 when they are 18 months old, they are fully grown up, running fast up and down in the compound, standing stock still at noise, rooting in the ground and collecting straw in mouth and placing them to prepare nests. In the Attarekhat T.E. there are one boar and five sows from June 1973 and it is expected that some will farrow soon.

In the Assam State Zoo with the help of fund provided by the Assam Valley Wild Life Society an enclosure was made to breed pigmy hogs under as near ideal conditions as

possible away from the disturbance of visitors. The hogs were also received through the same society. To begin with (12.1.73) we had only one mature sow. On 9.2.74 she was joined by a pair, and this sow gave birth to a litter of 3 piglets on 14.5.74. (The gestation period is about 4 months).

They were brought up by their mother (breast feeding) and now in October after five months they are found roaming freely inside the enclosure and taking part of rations along with the adults. The daily rations to the pigs per head consists of 250 grams of boiled broken rice (Khudi) and wheat bran, banana, 300 gram of carrot, sweet potato, cabbage, 25 gram of bread and 25 gram of soaked gram. They are found to be eating the tender leaves of Nal, Khagori and Dhoob grass. They feed mostly at night.

Along with captive breeding it is essential that one pigmy hog reserve (breeding colony) is set up in ideal natural surrounding with security of freedom from predators and other disturbances to study their habits in control condition. An area of about 100 acres with a source of water and shade trees, but free from flooding is to be fenced with wire nets raised on brick walls coming from about 3 to 4 ft. under ground (This will cost about Rs. 1,00,000/-) where pigmy hogs are to be reared for ecological and behavioural study of their habits in natural condition.

Urchila inside Monas Wild Life Sanctuary is an ideal site for this as the forest department has got necessary staff to keep watch and ward over the enclosure. Another site is inside Barnadia R.F. near the plantation centre. Once a viable breeding colony is established, selected tourist and scientists interested in the study of pigmy hogs and in the preservation of Wild Life may be allowed.

Geographical and Altitudinal Distributoin of Amphibians and Reptiles in the Himalayas (PART II)

By

ROBERT C. WALTNER

REPTILES

Order Crocodilia

Family Crocodilidae

*54. **Gavialis gangeticus** Gmelin

The Indus, Ganges, Brahmaputra, Mahanadi Rivers, and their tributaries and the Kalandan River, Arakan. Elevation (?). (17,22)

*55. **Crocodylus palustris** Lesson

As far east as the Darrang Dist. on the Brahmaputra in Asam, north to Nepal, in Baluchistan, near the Iranian frontier, the whole of the Indian Peninsula and Ceylon, extending west as far as the Dasht River. Elevation (?). (17, 22)

Order Testudines

Family Emydidae

56. **Geoemyda tricarnata** Blyth

Sikkam, Darjeeling, Chaibasa Dist., Chota Nagpur, Jalpaiguri Dist., N. Bengal, Daflas Hills, Bisnath Plain, and N. Assam. 0—3,000 feet. (17, 21, 22)

57. **Geoemyda trijuga** Annandale

Sikkam, Darjeeling, Chota Nagpur, Jalpaiguri Dist., and N. Bengal. 0—3,000 feet. (17, 21, 22)

*58. **Geoclemys hamiltoni** Gray

N. India from Sind to Bengal. Precise data of locality are rare; it is said to be common in the lower Ganges. Elevation (?). (17, 22)

*59. **Hardella thurji** Gray

The Gangetic and Barhmaputra river systems. Elevation (?). (17, 22)

*60. **Kachuga smithi** Gray

The tributaries of the Indus. Much rarer in the Ganges watershed. Elevation (?) (17, 21, 22)

*61. **Kachuga tectum** Gray

N. India—the Ganges, Brahmaputra, and Indus river systems. The exact limits of its range are not clearly defined. Elevation (?). (17, 22)

62. **Kachuga Dhongoka** Gray

N.E. India, the Ganges as far west as Allahabad, and north to Nepal, and Uttar Pradesh. Plains to 3,000 feet. (17, 21, 22)

*63. **Kachuga kachuga** Gray

E. and W. Himalayas and the Gangetic river system of Bengal, Nepal and Uttar Pradesh. Plains to 3,000 feet. (17, 21, 22)

Family Testudinidae

64. **Testudo elongata** Schoepff

Sikkim, Darjeeling, from Teak forests of Nepal to Tonkin, the Khasi Hills, and in the Malay Peninsula as far South as Penang. 0—9,000 feet. (17, 21, 22)

Family Trionychidae

*65. **Lissemys punctata** Bonnaterre

Sikkim, the Ganges, Indus, and their tributaries, in Akyab, and on Jergo Island off the coast of Arakan. Plains to 3,000 feet. (17, 21, 22)

*66. **Chitra indica** Gray

Nepal, N. India, Thailand and the Malay Peninsula. Plains to 3,000 feet. (17, 21, 22)

*67. **Trionyx gangeticus** Cuvier

Extends north to the base of the Nepal foot-hills, the Indus, Ganges, Mahanadi, and their tributaries, the N.W.F.P., common in Dera Ismail Khan, and near Karachi. Plains to 3,000 feet. (17, 21, 22)

Order Squamata

Suborder Sauria

Family Gekkonidae

68. **Cyrtodactylus fasciolatus Blyth

W. Himalayas (Simla, Almora, and Kumaon). 3,000—9,000 feet. (18, 21, 22)

69. **Cyrtodactylus khasiensis** (Jerdon)

Sikkim, Darjeeling Dist., Assam (Khasi Hills), Abor country, and Upper Burma (Mogok). 3,000—6,000 feet. (18, 21, 22)

70. **Cyrtodactylus gubernatoris** Annandale

Sikkim and Darjeeling Dist. 0—3,000 feet. (18, 21, 22)

71. **Cyrtodactylus stoliczkai (Steindachner)

Kashmir, the N.W.F.P., common in Chitral and Ladak, W. Tibet, and Mediterranean palearctic. 3,000—12,000 feet. (18, 21)

72. **Cyrtodactylus lawderanus (Stoliczka)

W. Himalayas, Simla Dist., Kulu Valley, Almora, Garhwal, and Ambala. Plains of India. 0—6,000 feet. (18, 21, 22)

*73. **Hemidactylus brooki** Gray

The whole of India and Ceylon from western Nepal east to the Khasi Hills, common in Pegu, rare farther north in Burma, from Sadiya in N.E. Assam, Yunnan, and S. China. Plains to 6,000 feet. (18, 21, 22)

*74. **Hemidactylus flaviviridis** Rüpell

N. India and westward through Iran and Arabia to the shores of the Red Sea. It does not occur east of Bengal, nor, with the exception of the individuals recorded from Bombay, south of lat. 20°. Plains to 3,000 feet. (18, 21, 22)

75. **Hemidactylus bowringi** (Gray)
Sikkim, Darjeeling, Godavari Valley, Khasi Hills, Chittagong, Burma (Myitkyina Dist., Thayetmyo, Minhala, and Pegu), Yunnan-fu, Hong Kong, and S. China. Plains to 9,000 feet. (18, 21, 22)
76. **Hemidactylus garnoti** Dum and Bibr.
Sikkim, Darjeeling, Assam (Sibsagar), Khasi Hills, Burma (Toungoo Ye coast), N. Thailand (Ban Piping and Chieng Dao), the East Indies, Oceania, Tong-King, and Hainan. Apparently rare on the continent of Asia. 0—6,000 feet. (18, 21, 22)
- **77. **Hemidactylus bisoki** Gray
Kulu Valley (W. Himalayas). 6,000 feet. (1)
78. **Hemidactylus nepalensis** Annandale
Kathmandu, Nepal. 4,500 feet. (10)
79. **Hemidactylus frenatus** Schlegel
Sikkim, Darjeeling, E. Nepal, plains of India, Lower Burma, Yunnan, and S. China. Plains to 9,000 feet. (21, 22)
80. **Cosymbotes platyrus** (Schneider)
Sikkim, Darjeeling Dist., C. Nepal, N. India, Ceylon, Indo-China, the East Indian Archipelago, Hong Kong, and Formosa. 0—6,000 feet. (18, 21, 22)
- **81. **Alsophylax himalayansis** Annandale
Parampur, Simla Dist., and W. Himalayas. 4,500 feet. (5)
- Family Agamidae
82. **Draco maculatus** (Gray)
The whole of the Indo-Chinese Peninsula from E. Himalayas and Assam (Naga Hills and the Abor Country) to Hainan and the Nam-son Mts., Tong-King 0—3,000 feet. (1, 21)
83. **Japalura tricarinata** (Blyth)
Sikkim, Darjeeling Dist., and E. Nepal. 3,000—12,000 feet. (10, 18, 21, 22)
- **84. **Japalura major** (Jerdon)
W. Nepal and the W. Himalayas (Simla, Garhwal, and Chamba Dist.). 3,000—8,500 feet. (10, 18, 21, 22)
- **85. **Japalura kumanonensi** (Annandale)
The W. Himalayas (Almora, Nainital, Kuman Dist., and Mussoorie). 3,000—9,000 feet. (10, 18, 21, 22)
86. **Japalura andersoniana** Annandale
E. Himalayas, in the Dafia Hills, and in the Abor country at about 4,000 feet. 3,000—6,000 feet. (18, 21)

87. **Japalura variegata** Gray

The E. Himalayas (Sikkim, Darjeeling, and Jalpaiguri Dist.). Common in Sikkim from elevations of 1,000—9,000 feet. (18, 21, 22)

*88. **Calotes versicolor** (Daudin)

Common in Darjeeling Dist., Nepal, and Kumaon up to 6,000 feet but not above 7,000 feet. The whole of the Indian and Indo-Chinese Sub-regions, Afghanistan, Ceylon, the Andaman Islands, Pulo Condore, Hainan, Hong Kong, S. China, and northern part of the Malay Peninsula (1, 3, 10, 21, 22)

89. **Agama himalayana (Steindachner)

Kashmir and the adjacent country in E. Turkestan and C. Tibet, and the N.W.F.P. (Chitral Dist.). 6,000—12,000+ feet. (18, 21, 22)

*90. **Agama tuberculata** Gray

The W. Himalayas from Kathmandu Dist. in Nepal to Kashmir, the Alpine Punjab, Afghanistan (Kabul), and W. Tibet. Common in Simla, Garhwal, and Kumaon, Dist. and about Murree in N.W. Punjab, and Kangra and Kulu Valley. 0—12,000+ feet. (1, 18, 21)

91. **Agama agrorensis (Stoliczka)

Kashmir (Jhelum Valley, Chilas), Chitral (Arandu), Punjab (Agror, or Oghi Valley), W. Tibet, and Mediterranean palearctic. 3,000—9,000 feet. (1, 18, 21)

92. **Phrynocephalus theobaldi Blyth

Kashmir, Southern Tibet, and E. Turkestan. Sandy places from 9,000—17,000 feet. (18, 21, 22)

*93. **Phrynocephalus reticulatus** Eichwald

Ladak in Kashmir, Turkestan, and westwards to the shores of the Caspian Sea. Plains to over 12,000 feet. (18, 21)

94. **Mictopholis austeniana** Annandale

E. Himalayas. 0—3,000 feet. (21)

*95. **Sitana ponticeriana** (Cuvier)

E. and W. Himalayas and plains of India. Plains to 3,000 feet. (21, 22)

Family Tcincidae

*96. **Mabuya macularia** (Blyth)

Khasi Hills, Nepal, Type 3 (Smith, 18) in N.W. India as far west as Karachi and north to Dehra Dun Dist., (U.P.), and N. and Lower Burma. Plains to 3,000 feet. (18, 21, 22)

- *97. **Mabuya carinata** (Schneider)
The Indian Peninsula except in the North-West. Very rare, if it exists at all, north of a line drawn from Kathiawar to the western end of Nepal, Sikkim, Darjeeling, and W. Himalayas. Plains to 3,000 feet. (18, 21, 22)
98. **Mabuya multifasciata** Kuhl
Sikkim, Darjeeling, Khasi Hills, N. and Lower Burma, and Yunnan. 0—9,000 feet. (21, 22)
- **99. **Mabuya dissimilis** (Hallowell)
W. Himalayas, plains of India, and Mediterranean palearctic. Plains to 6,000 feet. (21)
100. **Lygosoma indicum** (Gray)
The E. Himalayas (Darjeeling, Sikkim), Khasi Hills, S.E. Tibet, the whole of Indo-China, Hainan, S. China, and the Malay Peninsula. 0—12,000 feet. (18, 21, 22)
101. **Lygosoma indicum** (Blyth)
The E. Himalayas (Sikkim, Darjeeling Dist., up to 7,000 or 8,000 feet), Khasi Hills, N. Bengal (Parasnath Hills), Assam, S.W. Yunnan, Burma and Thailand as far south as the Isthmus of Kra, Cambodia, S. Annam (Daban, Lanbbian Plateau), and the Andaman and Nicobar IS. 0—9,000 feet. (18, 21, 22)
102. **Lygosoma courcyanum** Annandale
E. Himalayas, Khasi Hills, and Totung in Assam. 3,000—6,000 feet. (18, 21)
- *103. **Leiopisma himalayanum** (Günther)
Kashmir, the Punjab, Simla and Garhwal Dist., Allahabad, N.W.F.P. (Chitra) Mussoorie, Nainital (U.P.), Nepal, and S. Turkestan. 6,000—14,000 feet. (3, 10, 18, 21, 22)
- **104. **Leiopisma ladacense** (Günther)
Ladak and adjacent Dist. 9,000—14,000 feet. (18, 21)
105. **Leiopisma sikkimense** (Blyth)
The E. Himalayas, (Sikkim, Darjeeling Dist., Nepal, Kathmandu, Chitlong), N. Bengal (Pangpur Dist.), Bihar (Parasnath Hills), and S. Tibet. 3,000—10,000 feet. (18, 21, 22)
106. **Riopa albopunctata** Gray
Khasi Hills, Nepal, Denkanikota Hills and near Ellore in the Godavari Dist., Bilaspur (M.P.), Dhilka Lake, Purneah, Muzaffarpur (Bihar and Orissa), Calcutta, Mundiaghut (U.P.), Dibrugarh, and Kokilamukh (Assam). Plains to 3,000 feet. (18, 21, 22)

*107. **Riopa punctata** (Gmelin)

Nepal, W. Himalayas, Subathu (Simla Hills), in hilly country but at no great altitude. From the Yellagiri, Anaimalai, Nilgiri, Sivagiri, and Shevaroy Hills, Nilambur, Coimbatore, Madura Dist., Cuddapah and Salem Dist. near Madras, Belgaum, Godavari Dist., Golconda, Jeypore Hills, pass between Chaibassa and Chakradharpur, near Bilaspur (M.P.), Pharisama Hills (Rewa Dist.), Hurklana, Allana, Allahabad, and Hazara and Meerut (U.P.). Plains to 6,000 feet. (18, 21, 22)

108. **Eumeces taeniolatus (Blyth)

Kashmir, N.W.F.P., Kutch, Sind, Rajasthan, Punjab (Salt Range), and from N.W. India to Transcaspiia. Plains to 6,000 feet. (18, 21)

109. **Ophisops jerdoni Blyth

W. Himalayas and adjacent plains. Eleavtion (?). (22)

Family Anguidae

*110. **Ophisaurus gracilis** (Gray)

From the E. and W. Himalayas (Sikkim and Darjeeling) to Western Yunnan, north to the Abor country, Khasi Hills, and south in Burma to lat. 23°. 3,000—9,000 feet. (18, 21, 22).

Family Varanidae

*111. **Varanus monitor** (Linnaeus)

Sikkim, Darjeeling, Nepal, Bigrani (W. Himalayas), throughout India, Ceylon, Assam, the greater part of Burma, and Mediterranean palearctic. Plains to 6,000 feet. (18, 21, 22)

*112. **Varanus flavescens** (Gray)

Nepal, W. Himalayas, and N. India from the Punjab (Salt Range) to W. Bengal. Plains to 3,000 feet. (18, 21, 22)

113. **Varanus salvator** (Laurenti)

The E. Himalayas up to 6,000 feet (Sikkim, and Darjeeling), Khasi Hills Eastern Bengal, Ceylon, the Andaman and Nicobar Islands, the East Indian Archipelago, Indo-China, Southern China, and N. Australia. (18, 21, 22)

Suborder Serpentes

Family Typhlopidae

*114. **Typhlops porrectus** Stoliczka

E. and W. Himalayas, Khasi Hills, N.W.F.P., Punjab, U.P., Bihar and Orissa, Bombay Dist., Bangalore, Travancore, Ceylon (Punduloya), Pakistan, and Upper Burma (Pyawbwe). Plains to 6,000 feet. (20, 21, 22)

115. **Typhlops jerdoni** Boulenger
E. Himalayas (Sikkim, Darjeeling, and the Duars Dists.), Khasi Hills, Abor Hills, and Upper and Lower (Lashio) Burma. 0—6,000 feet. (20, 21)
- *116 **Typhlops braminus** Daudin
E. and W. Himalayas, Khasi Hills, plains of India, Ceylon, East Indian Is., the Andaman and Nicobar Is. and islands of the Indian Ocean, Indo-China, Hainan S. China, Malay Peninsula, and Mexico. Plains to 3,000 feet. (20, 21, 22)
117. **Typhlops oligolepis** Wall
E. Himalayas (Sikkim, Nagri Valley, and Darjeeling Dist.), 3,000—6,000 feet. (20, 21, 22)
- *118. **Typhlops bothriorynchus** (Günther)
E. and W. Himalayas. 0-3,000 feet. (21, 22)
119. **Typhlops tenuicollis** (Peters)
E. Himalayas and N. Burma. 3,000-6,000 feet. (21)
- Family Boidae
- **120. **Eryx conicus** Schneider
Naini Tal Dist. in the Himalayas, Sind and Baluchistan in the west, the whole of India as far as Bihar and Orissa in the north-east, and very rare in Ceylon. Plains to 3,000 feet. (20, 21, 22)
- *121. **Python molurus** (Linnaeus)
E. and W. Himalayas, Khasi Hills, plains of India, N. and Lower Burma, and S. China. Plains to 6,000 feet. (10, 21, 22, 24)

Family Colubridae

Subfamily Pareinae

122. **Pareas macularius** Theobald
Sikkim, Bengal (Gopaldhar, Darjeeling Dist.), Burma (Htingnan, Mogok, Kyaphyin, Shwali Man, Kalaw, and Martaban), and Tong-King. Plains to 3,000 feet. (20, 21, 22)

Family Colubridae cont.

123. **Pareas monticola** Cantor
E. Himalayas (Darjeeling Dist., Sikkim through Assam, Jaipur, and the Sadiya Frontier Tract), Naga and Khasi Hills, and Abor foot-hills. 0-6,000 feet. (20, 21, 22)

Subfamily Dasypeltinae

124. **Elachistodon westermanni** Reinhardt
Sikkim, Darjeeling, and plains of India. Plains to 3,000 feet. (20, 21)

Subfamily Colubrinae

125. **Elaphe prasina** Blyth

From the E. Himalayas (Sikkim and Darjeeling Dist.) through Assam, Upper Burma and Yunnan to Tong-King, Col des Nuages, and south to the Malay Peninsula. 0—9,000 feet. (20, 21, 22, 24)

126. **Elaphe radiata** Schlegel

The E. Himalayas (Sikkim and Darjeeling), Orissa (Cuttack), through the whole of the Indo-Chinese subregion to the Malay Archipelago, Yunnan, and S. China. Plains to 9,000 feet. (20, 21, 22, 24)

*127. **Elaphe helena** Daudin

E. (Sikkim and Darjeeling) and W. Himalayas, Assam (Naga Hills), Peninsular India to Sind in the North-West, Ceylon, and N. Burma. Plains to 3,000 feet. (20, 21, 22)

128. **Elaphe taeniura** Cope

Sikkim, Darjeeling, Burma (Abor country, Rong to Valley north of Rima, Pangnamdim, north of Fort Hertz, Chin Hills, Pakkoku Dist.), in the Indo-Chinese region, Tenasserim (Sukli), Tong-King, Hong Kong, and Thailand (Muang Fang in the north, Himlap in the Dong Rek Mts.). 3,000—12,000 feet. (19, 20, 21, 22, 24)

(Continued)

A Remarkable Indian Tomb Bat

By

H. KHAJURIA

There are four species of tomb bats inhabiting Central India: *Taphozous longimanus* Hardwicke, *T. melanopogon* Temmink, *T. theobaldi* Dobson and *T. kachchensis* Dobson. I have collected and studied all the four but I find the first species (*T. longimanus*) as truly remarkable regarding its habits. We are concerned here with particularly Central Indian nominate race. The bat is highly eclectic in geographical distribution, selection of the diurnal roosts and in breeding season (Ellerman and Morrison-Scott, 1951; Gopalakrishna 1955; Brosset, 1962). It has been found to possess diurnal roosts in wells, deserted dark constructions, on the well-lighted ceiling of verandahs, on the external surface of walls of houses, under eaves, hollows of trees etc.—what a bewildering variety. It breeds through-

out the year, each female becoming pregnant more than once in a year possible in quick succession (Gopalakrishana : *op. cit.*). Brosset (*op. cit.*) considers this habit as a unique in old world bats.

It has been possible to collect still more interesting data about its habits during a study of bats of Central India.

Diurnal roost: The most interesting diurnal roost of this bat has been found by the author in Jabalpur District. This is the upper portion of the trunk of the palmyra palms. This portion is usually hidden by the drooping dead leaves but some individuals may be visible from below. The same tree may be inhabited by other species of bats, the yellow-bellied bat *Scotophilus temmincki wroughtoni* Thomas (Vespertilionidae) and the short-nosed fruit bat, *Cynopterus sphinx gangeticus* Anderson (Pteropidae). However, the three forms inhabit different parts of the tree. *C. sphinx gangeticus* occupies the under surface of green leaves, while *S. temmincki wroughtoni* is usually found in the drooping dry leaves.

If disturbed *T. l. longimanus* flies away and tries to occupy any hole or cavity in nearby trees or houses. Two colonies in palm trees were observed in Jabalpur District and were found in permanent occupation of the palm trees throughout the year while other individuals observed elsewhere were seen only for short periods. A few small colonies (2-4 individuals) observed on the ceiling of verandahs of the houses always contained adult males and females and were possibly breeding individuals which have left the main colonies on the palm trees probably because of pursuit of females by males. Some of these colonies may include individuals which may have left the main colony or have failed to return to it because of stormy weather. This suggestion is supported by the fact that the other two species which inhabit palmyra palms have also very rarely been found in the present study in very small number in verandahs of houses and cavities in trees in unfavourable weather.

Another peculiar habitat of this tomb bat was found near village Manot, Mandla district, M.P. in November. Here a colony of about fifty individuals was found in an extensive slit about 13 m. $\times$ 2 m. (deep) $\times$ 4 cm. wide), running vertically in the middle of a cemented pillar of a bridge on the Narbada river. Most of the specimens were well exposed and some of them were only about a metre above the surface of water. The colony was observed for about 2½ weeks and the roost was, thus, not temporary.

Such bizarre habitats of the form are highly interesting.

Sound produced: In flight bats are known to avoid various objects and locate their prey by a process known as echolocation which consists in reception of reflected high frequency sound waves inaudible to human ear from objects. This bat has been found by the author to use sound waves which are audible to human ear in echolocation. These sounds resemble *chin-chin* very rapidly repeated. The importance of bat in the study of echolocation, is, therefore, very significant. Another peculiar sound given out by the animal resembles *thak* or *ak*. This is given out with upward jerk of head when the animal is

annoyed e.g. when the animal is unable to come out of the cage. The audible echolocatory sounds have however been observed by the author in some other species of genus *Taphozous*. The second type of sound has also been noted in some other forms of bats.

Interesting aspects of external morphology (Pl. I)

Species of genus *Taphozous* are fast flying bats which possibly feed on high flying insects (Brosset, 1962).

The tail of these bats is peculiar in that it protrudes from the dorsal surface of interfemoral membrane and is enclosed in a sheath. The interfemoral membrane is truncated at the posterior end because the tail does not reach the posterior border of the membrane. The adaptive significance of these characters have not so far been understood. Since some species of bats are known to catch flying insects into a pouch formed by interfemoral membrane and then to pick it up with mouth (Peterson, 1966, p. 100-103), it is possible that these bats also use the interfemoral membrane in a similar manner but the tail is kept straight for use as balancer during the process because it can be kept stretched when the interfemoral membrane is bent into a pouch in fast flight. It will be very interesting to photograph the hunting activity of the bat by ultra-high speed photography being used in the study of movements of other bats.

There is a marked depression behind the snout covered over by loose skin. This possibly acts as buffer or cushion to save the cranium from high air pressure during fast flight. Remarkably enough such a character is also found in swifts with which these bats are sometimes found in flight. Allen (1941) pointed out that fast flying bats have two articular surfaces to the head of the humerus possibly to give additional strength to the wing. A similar function is probably served by a membrane which stretches in these bats between fifth metacarpal and the forearm and form a pouch. Other adaptation, to fast flight such as long and pointed wing, flattened and pointed snout as in swifts are already well known.

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NEWS AND NOTES

The Indian Board for Wild Life was reconstituted in July 1974 and the Society finds representation on it. The first meeting of the Indian Board for Wild Life was held on the 27th July, 1974 under the chairmanship of Dr. Karan Singh, Minister for Health, Government of India. Dr. Karan Singh is no stranger to Wild Life enthusiasts and conservationists, not only in India but in the world. We congratulate him on his being nominated the Chairman and look forward to a dynamic programme of conservation and to making the Indian Board of Wild Life a more effective organisation. In Shri B.P. Maurya, Minister of State in the Ministry for Food and Agriculture, Government of India, the Board has a every keen and active Pro-Chairman who has a contribution to make in the meetings of the Board. The Vice Chairman is the world famous Ornithologist Dr. Salim Ali, who needs no introduction to the readers of Cheetal. Last, but not the least the Board has a dedicated conservationist in the knowledgeable Secretary Shri Ranjit Singhji, Deputy Secretary in the Ministry of Food and Agriculture.

One important recommendation of the Board at this meeting was that Wild Life should be on the concurrent List in the Indian Constitution. If the recommendation is accepted by the Government and the Constitution amended, the consequences would be greatly beneficial to conservation and to the preservation of our fast vanishing wild life heritage.

The Government of India with the consent of the States enacted the Wild Life Protection Act 1972. Rules under the Act have not yet been framed and approved by majority of States. With Wild Life legislation the position being 'now or never' such delay to say the least is unpardonable. We hope that the States concerned will do the needful and implement the legislation at the earliest.

The Government of Uttar Pradesh, by a recent order, has banned all shooting for one year inside Government Forests as well as outside areas, therefore no game licences will be issued. It is feared that this may result in more freedom for the poacher as there is not enough staff to enforce this order to which hardly any publicity has been given and it is only when the sportsman applies for a permit that he is told of the existence of the order.

Recently a controversy raged over the death of Sunder a Sundarban tiger under circumstances which could have been controlled by men concerned and the tiger could have lived a longer life. This young tiger was accused of man eating and the Forest staff is to be

congratulated for their efforts in proving that he was not a man-eater but a man killer and that too by accident. The controversy arose on points whether the pug marks of a tiger and tigress can be distinguished or not; whether tigers are territorial animals or not and finally whether the released tiger was in a fit condition to be released and if not why a watch was not kept after release. The controversy was expressed over the radio, television and also newspapers, particularly those published in Calcutta.

The tiger was shot with a capture gun, caught and caged, transported to another locality and released where another tiger is alleged to have mauled and killed the released one. What is of concern is that we have lost a tiger and that all the experts present could not prevent the tragedy and if ordinary precautions had been taken the tragedy would not have occurred. Shooting with capture guns using chemicals as bullets is an operation requiring scientific research to determine the quantity of drug to be used, the type of drug the animal on which it can be used, the weight of the animal etc. Enough research has not been carried on the use of such drugs on tigers.

Some years back a tiger had been trapped in the Shivalik Forest Division and the Wild Life staff faced the problem of releasing the tiger. A capture gun and ammunition were brought from Lucknow and the tiger was shot to make it unconscious when it could be released. The effect was that the tiger became more active and wrenched its forepaw clear from the spring trap and escaped. It was explained that the drug bullet instead of putting the tiger to sleep only made it more active and it escaped. So the fault lay with the drug.

DEVELOPMENT PROJECT AND WILD LIFE

Wild Life Sanctuaries and Parks Threatened

The proposed, probably sanctioned irrigation canal from Rishikesh towards Hardwar on the left bank of the Ganges poses a threat to the wild life of the area of Chilla forest unless arrangements are made for drinking water for wild animals who normally come to the Ganga river to slake their thirsts particularly during the summer season. The deep cement canal will be a barrier between the animals and the river Ganga. Elephants are likely to fall in the canal when trying to drink water from the canal. Many other wild animals will meet the same fate. The canal must be built for use by human beings but certainly arrangement could be made for drinking water for wild life of the forests on the left bank of the Ganges.

CORBETT PARK

Dhikala Chaur will be mostly lost as the water rises and submerges it because of Ramganga Dam. The dam started filling up this year. The Forest Department has started developing two other sites to attract the wild life being displaced from Dhikala.

One of the sites Paterpani is again endangered because of another dam being proposed at this site. A survey is on for the new dam project. A new site must be found for the dam or for the wild life. The mute denizens of the jungle invariably suffer. The Forest and the Public Works Department of Uttar Pradesh must consult each other when embarking on new projects. Will it not be still better if all such development projects are submitted for advice and clearance to the Wild Life Board before they even start surveying the site.

MADUMALAI WILD LIFE SANCTUARY

A proposed 30 megawatt hydroelectric project on the Moyar river threatens, the greater part of Madumalai Wild Life Sanctuary in Tamil Nadu, together with forest lodges and forest rest houses the sanctuary adjoins the Bandipur Sanctuary and was omitted from the list of tiger sanctuaries selected for Project Tiger because of this hydroelectric threat. Gaur, Elephants, Leopards and Cheetal will be lost if the scheme goes ahead.

* * * *

I would like to bring it to your notice that recently Custom authorities in Delhi auctioned some confiscated articles including a sizable number of SG, and LG cartridges for 12 bore guns. This ammunition is banned in the Country in the interest of Wild Life preservation. This looks rather funny to me that one organ of the Government declares the article banned and the other organ of the same Government makes it available to the public. Right hand doesn't know that the left hand is doing. The cartridges were sold for Rs. 7/- per piece. Prepositions!

We should protest against permitting this ammunition to be auctioned and making it available to dealers and ultimately to poachers.

Sher Jung

हाथी दांत

(लेखक—राजेन्द्र बहादुर सक्सेना)

एम० एस० सी०, एलएल० बी०, ए०, आई० एफ० सी०, आई० एफ० एस०

(उप अध्यापक, तैलू पत्तावन प्रभाग, इलाहाबाद)

कहावत है कि हाथी के दांत खाने के और होते हैं, और दिखाने के और। यों तो इस कहावत का प्रयोग कथनी और करनी का अन्तर व्यक्त करने के लिए होता है किन्तु यह भी सत्य है कि हाथी खाना खाने में उन दांतों का प्रयोग नहीं करता जो बाहर दिखलाई पड़ते हैं। हाथी के दांत जिन्हें उद्न्त, संस्कृत में हस्तिदन्त तथा अंग्रेजी में 'टस्क' कहते हैं, हाथी की शोभा हैं और उसकी विशालता में चार चांद लगा देते हैं। कहा जाता है कि 'अगर घेर जंगल की शान है तो हाथी जंगल की जान है।' अपने भारी-भरकम शरीर के कारण ही कहा जाता है कि 'हाथी चाहे जितना भी लट जाये तब भी भेंसा बना रहेगा'। निराली सूँड़, स्तम्भ के समान पैर और सूप जैसे कान हाथी को महान्तम बना देते हैं। एक बार एक ग्राम से रात्रि में एक हाथी गुजरा। वहाँ के निवासियों ने हाथी नहीं देखा था। प्रातःकाल जब वे उठे तो उन्होंने भूमि पर बड़े-बड़े पदचिन्ह देखे। उनकी समझ में नहीं आया कि वे किस जीव के पद-चिन्ह हैं। तब वे कवि 'लाल बुभुक्कड़' के पास पहुँचे और उन्होंने अपनी समस्या बताई। लाल बुभुक्कड़ ने उन पद-चिन्हों को देखा और विचार करने के उपरान्त बताया :

लाल बुभुक्कड़ बुभु के और न बुभु कोय,
पैर में चक्की बाँध के हिरना कूदो होय।

हाथी की चाल भी निराली है और इसीलिए साहित्यकारों ने 'गजगामिनी', काम शास्त्रियों ने 'हस्तिनी' जैसे प्रकार नारियों के बताये। इन्द्र को हाथी प्रिय था और उनके हाथी का नाम 'ऐरावत' था जिसके विशालकाय उद्न्त थे। दिलवाड़ा मन्दिर में उद्न्तक (टस्कर) की सुन्दर प्रतिमा है। निःसंदेह हाथी अभिजात पशु है।

संसार में हाथी की केवल दो प्रजातियाँ पाई जाती हैं—एशियाई (एलिफस) तथा अफ्रीकी (लॉक्सो-डोन्टा)। भारतीय हाथी (एलिफस मैक्सिमस) को संस्कृत में हस्ति, गज; हिन्दी हाथी (पुल्लिग), हथिनी (स्त्रीलिग); मराठी में हट्टी; तमिल में अनई; मलयालम में अना; कन्नड़ में अने। और अंग्रेजी में इंडियन ऐलिफेंट कहते हैं। भारतीय हाथी के ही साधारणतया सुविकसित उद्न्त होते हैं। और भारतीय हथिनी के उद्न्त मुँह के बाहर नहीं दिखलाई पड़ते अथवा केवल कुछ सेन्टीमीटर निकले रहते हैं किन्तु अफ्रीकी हथिनी के उद्न्त होते हैं। और बाहर दिखलाई पड़ते हैं। किन्तु वे नर की अपेक्षा छोटे होते हैं। उद्न्तों की रूपरेखा भिन्न-भिन्न होती है—कभी वे सीधे होते हैं, कभी मुड़े हुए; कभी वे नीचे की ओर झुके हुए होते हैं। भारत में कुछ हाथियों के उद्न्त नहीं होते अथवा हथिनियों के समान बाहर दिखलाई नहीं पड़ते। ऐसे उद्न्तहीन हाथियों को 'मकना' कहा जाता है। इस प्रकार के हाथियों में से अनेकों अत्यन्त हृष्ट-पुष्ट तथा विशालकाय होते हैं और उनके सुविकसित सूँड़े होती हैं। मकना भी 'मस्त' में देखे गए हैं और दक्षिण भारत में वे सतत रूप से शान्त एवं सरल देखे गए हैं किन्तु उत्तर-पूर्व भारत में

वे 'बदमाश' (रोग) भी देखे गए हैं और तब वे उदन्तक से कम भयंकर नहीं होते। यद्यपि उदन्त आत्मरक्षा का महत्त्वपूर्ण अंग है किन्तु उनके न होने से कोई अड़चन नहीं पड़ती और कई बार उत्तर-पूर्व भारत में जंगली हाथियों के भुंड जिसमें उदन्तक भी सम्मिलित थे, का नेतृत्व मकना को करते देखा गया है। इसका कारण यह है कि प्रकृति उदन्तों की शक्ति की कमी को पूरा करने के लिए मकना का आकार बड़ा बनाती है और उनकी गर्दन, सिर तथा सूंड अधिक बलवान होती है। टस्कर और मकना के द्वन्द्वयुद्ध में मकना अपने प्रतिद्वन्दी के उदन्त को अपनी सूंड से तोड़ सकता है। यही कारण है कि वनों में कभी-कभी एक उदन्त के हाथी दिखाई पड़ते हैं जिन्हें 'गणेश' कहते हैं।

सन् १९३६ ई० में आसाम में एक सुन्दर एकदन्त वाला पालतू हाथी था। यद्यपि वह आकार में अपेक्षाकृत बड़ा नहीं था किन्तु वह अत्यन्त शक्तिशाली था और उसका केवल एक उदन्त था जिसकी नोक ऊपर की ओर मुड़ी थी और वह अपने विचित्र रूप के कारण अत्यन्त भयावह दृष्टिगोचर होता था। एक बार जब वह मस्ती में था, उसे नहलाने के लिए नदी पर ले जाया गया किन्तु किनारे पर से ही उसने एक उदन्तक को देखा जिससे उसका द्वन्द्वयुद्ध पहले एक बार हो चुका था और जिसमें वह पराजित हो गया था। उसको देखते ही वह नियंत्रण के बाहर हो गया और महावत को वहीं छोड़ कर नदी की दूसरी ओर भागकर पहुंचा और अपने प्रतिद्वन्दी से भिड़ गया और झटका देकर उसके बगल में अपना उदन्त घुसेड़ दिया और कुछ सेकंडों में वह मर गया। गणेश जी हिन्दुओं के प्रमुख देवता हैं। और किसी भी शुभ कार्य करने के पूर्व इनकी आराधना 'श्री गणेशाय नमः' की जाती है। गणेश जी को गजानन तथा विनायक भी कहते हैं और इनके केवल एक उदन्त बतलाया गया है अतएव गणेश जी को 'एकदन्त' भी कहते हैं। गणेश-पुराण में उल्लेख है कि एक बार पार्वती जी हिमालय की एक गुफा में तपस्या कर रही थी और उनको गुफा-द्वार पर बैठाने के लिए एक रक्षक की आवश्यकता पड़ी जिससे तपस्या में कोई विघ्न न डाल सके। अतएव उन्होंने अपने शरीर के मूल (सत्व, राजस तथा तामस तीनों अवयवों के पदार्थ का मिश्रण) मानव आकृति का पिंड बनाया और चमत्कार से उसमें जान डाल दी और उसको गुफा-द्वार पर रक्षक के रूप में बैठा दिया जिससे कोई गुफा में न आ सके और तपस्या में कोई विघ्न बाधा उपस्थित न हो। एक दिन शिव जी वहां आये और जब वह गुफा में घुसने लगे तो रक्षक ने मना किया और उनकी अन्दर घुसने से रोका। इस पर शिव जी को क्रोध आ गया और उन्होंने अपने त्रिशूल से उसका सिर घड़ से पृथक् कर दिया और वह गुफा में चले गये। वहां पार्वती जी ने पूछा कि रक्षक के रहते हुए वह वहां कैसे आये तो उन्होंने रक्षक की मृत्यु के सम्बन्ध में बतलाया। इस पर पार्वती जी को अत्यन्त दुःख हुआ और उन्होंने शिव जी से प्रार्थना की कि उस पिंड जिसे उन्होंने अपने पुत्र के समान माना, में पुनः जान डाल दें। तब शिव जी सिर को घड़ में लगाकर जान डालने के लिए आये किन्तु उन्हें सिर नहीं मिला और उसकी बहुत खोज की गई किन्तु सफलता नहीं मिली। तब शिव जी ने अपने गणों को आदेश दिया कि वे किसी हाथी के बच्चे का सिर ले आयें। गणों ने आज्ञा का पालन किया और जब शिव जी ने घड़ में हाथी के बच्चे का सिर लगा दिया तो रक्षक को पुनः जीवन प्राप्त हो गया। शिव जी ने रक्षक का नाम 'गजानन' (= गज + आनन अर्थात् हस्ति का मुख) रखा। गजानन के वक्र सूंड और विशालकाय शरीर है जिसमें करोड़ों सूर्यों का तेज है :

‘वक्र तुंड महाकाया सूर्यकोटि समप्रभा’

मृष्टि को जगत अथवा जग कहते हैं जबकि वह ओंकार के सूँढ़ के समान अन्तिम भाग से गज के रूप में बाहर निकलती है। वास्तव में ओंकार स्वयं गजानन हैं और जब गजानन के मुख्य शरीर से पदार्थ पृथक होता है तो दो अक्षर 'ग' और 'ज' अन्तर्निमय हो जाते हैं। गजानन को मोदक प्रिय हैं, उनका वाहन मूषक है, उनकी पताका घूमकेतु है और अंकुश तथा कुल्हाड़ी उनके अस्त्र हैं।

द्वन्द्वयुद्ध के अतिरिक्त हाथी को निश्चित रूप से अपने लम्बे और भारी उद्दन्तों से विशेषकर घने वनों में घड़चन पड़ती है। वनले नर शूकर के भी उद्दन्त होते हैं किन्तु वे अपेक्षाकृत छोटे होते हैं। उद्दन्तों के कारण हाथी पृथ्वी पर खाना खाने के लिए अथवा पानी पीने के लिए न तो अपना मुख सीधा रख सकता है और न कुछ चाट सकता है। उद्दन्त वास्तव में कर्तनदन्त (इन्सिज़र्स) हैं जो हाथी (मकना के अतिरिक्त) की सूँढ़ के दोनों ओर एक-एक होते हैं। ये ऊपरी जबड़े में होते हैं। इनकी वृद्धि आजीवन होती रहती है और ये वृद्ध हाथियों में साधारणतया १.८० मीटर से २.१५ मीटर तक लम्बे होते हैं। एक बार गड़वाल में एक बहुत बड़ा हाथी मारा गया जिसके उद्दन्त २.६७ मीटर लम्बे थे और उनमें से प्रत्येक का भार ७२.५८ किलोग्राम था। हाथी के निचले जबड़े में कर्तनदन्त नहीं होते और ऊपरी तथा निचले दोनों जबड़ों में द्वादन्त (कैनाइन टीथ) नहीं होते। तथापि प्रत्येक जबड़े में साधारणतया एक जोड़ा पश्चहानव्य (मोलर टीथ) होता है जो आकार में बहुत बड़ा होता है और उनमें अनुप्रस्थतया कूट (रिजिज) होते हैं और उनसे हाथी अपना खाना चबाता है। अपने जीवन काल में हाथी के प्रत्येक जबड़े में छः पश्चहानव्य निकलते हैं। हाथी की औसत आयु केवल सत्तर वर्ष है। दाँतों से हाथी की आयु का अनुमान किया जा सकता है। नया दाँत पुराने दाँत के पीछे निकलता है। हाथी का प्रथम दूध का दाँत (पश्चहानव्य) दो वर्ष की अवस्था में गिर जाता है, दूसरा छः वर्ष की अवस्था में, तीसरा नौ वर्ष की अवस्था में, चौथा (अथवा प्रथम प्रौढ़ दाँत) बीस और पच्चीस वर्ष के बीच में, पाँचवाँ साठ वर्ष की अवस्था में गिर जाता है और छठवाँ शेष जीवन के अन्त तक रहता है। प्रत्येक पश्चहानव्य अपने पूर्वज से बड़ा होता है। भारतीय हाथी में अन्तिम अथवा छठे पश्चहानव्य में सत्ताईस अनुप्रस्थ कूट हो सकते हैं किन्तु अफ्रीकी हाथी जो भारतीय हाथी से बड़ा होता है, में इनकी संख्या ग्यारह से अधिक नहीं होती। पच्चीस वर्ष की आयु के उपरान्त भारतीय हाथी को प्रत्येक जबड़े में केवल दो दाँतों पर ही निर्भर करना पड़ता है। उद्दन्त बहुमूल्य वस्तु है और एक जोड़े का मूल्य तीन हजार से पाँच हजार रुपये तक हो सकता है। बैंकाक के राजकीय संग्रहालय में ३.०१ मीटर लम्बे उद्दन्त रखे हैं; सम्राट् जार्ज षष्ठम् के पास दो उद्दन्त थे जिनमें से एक २.६७ मीटर लम्बा तथा दूसरा २.६० मीटर लम्बा था तथा उनका भार क्रमशः ७२.५७ किलोग्राम तथा ७३.०३ किलोग्राम था। ४५.५० किलोग्राम से अधिक भार के उद्दन्त अधिक नहीं मिलते।

उद्दन्त जिसे जन साधारण में 'हाथीदाँत' कहा जाता है, के अनेकों प्रयोग हैं। हाथी दाँत का प्रयोग सुन्दर मूर्तियाँ, खिलौने, चित्रकला का सामान, कलात्मक कृतियाँ तथा आभूषण जैसे अंगूठी, बाजूबन्द, कर्णफूल, भुमकी, माला, कंरुण, आदि बनाने में होता है। हाथी दाँत के चूड़ा के सम्बन्ध में निम्नलिखित लोकगीत प्रसिद्ध है :

गलियो गलियो री बीबी मनरा फेरे.....

अरे मनरा को लाओ कि बुलाय की बीबी मेरी
जान चूड़े पर घर दूँ, प्राण चूड़े पर तज दूँ,
चूड़ा तो हाथी दांत का ss, गलियो.....

काली भंगारिन बीबी पहन ले s

काली भंगारिन मनरा न पहनूँ ss

अरे काले मेरे राजा जी के केश, सलोने जी के
जान चूड़े पर घर दूँ, प्राण चूड़े पर तज दूँ,
चूड़ा तो हाथी दांत का ss गलियो.....

नीली भंगारिन गोरी पहन ले s

नीली भंगारिन मनरा न पहनूँ ss

अरे नीले मेरे राजा जी के तैन, सलोने जी के
जान चूड़े पर घर दूँ, प्राण चूड़े पर तज दूँ,
चूड़ा तो हाथी दांत का ss, गलियो.....

लाल भंगारिन गोरी पहन ले s

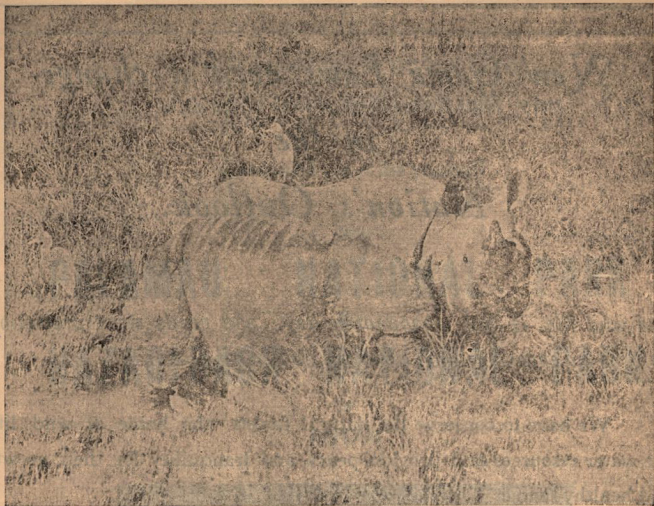
लाल भंगारिन मनरा न पहनूँ ss

अरे लाल मेरे राजा जी के होंठ, रसीले जी के
लाल चूड़े पर घर दूँ, प्राण चूड़े पर तज दूँ,
चूड़ा तो हाथी दांत का ss, गलियो.....

इसके अतिरिक्त विजयोपहार (ट्राफी) के रूप में हाथी दांतों (उदन्तों) को सजाकर रखा जाता है। हाथी दांत को आरी से काटा जा सकता है और जीवित पालतू हाथी में स्वामी उदन्तों की नोकें कटवाकर पीतल से मड़वा देते हैं। मरे हुए अथवा मारे हुए हाथी से भी उदन्त निकालकर काष्ठ के कलात्मक आघार पर इस प्रकार खड़े जड़ दिये जाते हैं कि उनही नोकें अन्दर की ओर रहें। मृत हाथी के सिर को यदि नहीं मड़वाना है तो खोरड़ो से उदन्त सरलतापूर्वक निकाले जा सकते हैं क्योंकि मांस हटाकर उस हड्डी को बाहर निकाल लिया जाता है जिसमें उदन्त जुड़े रहते हैं और फिर कुल्हाड़ी की सहायता से बेकार हड्डी काटकर उदन्त निकाल लिए जाते हैं तथा उदन्त के भीतर जाने वाली चेता (नर्व) को चाकू से काट दिया जाता है और इस पूरी क्रिया में दोनों उदन्त बाहर निकालने में लगभग दो घंटे लगते हैं। उदन्तों को तब जल से साफ कर लिया जाता है और हवा में सुखा लिया जाता है। उदन्तों पर जल, वायु, आदि का साधारणतया प्रभाव नहीं पड़ता किन्तु अधिक ताप से ये चटक जाते हैं। उदन्तों (टस्क) का व्यापार-नाम 'आईवरी' (हाथी दांत अथवा हस्ति दन्त) है। हाथी दांत की कलाकृतियां श्वेत होती हैं और इतनी छोटी तक बन सकती हैं कि उनको केवल अग्रशिक्ष द्वारा ही स्पष्ट देखा जा सकता है।

यह तो केवल 'अलिफ लैना' की कहानी है कि सिन्दबाद नाविक जब अपनी सातवीं तथा अन्तिम समुद्री यात्रा से वापस लौट रहे थे तो समुद्री डाकुओं ने उन पर आक्रमण किया और सारा सामान लूट लिया

और फिर एक सुदूर द्वीप में ले जाकर एक धनी व्यक्ति के हाथ उनको बेच दिया और उस धनी व्यक्ति ने सिन्दबाद को कार्य सौंपा कि वह घने वन से नित्य तीर-कमान से हाथी मार कर लायें और सिन्दबाद नित्य एक हाथी मारकर लाने लगे और एक दिन जब वह तीर-कमान लिये वृक्ष की शाख पर बैठे थे, हाथियों के भुंड ने उनके वृक्ष को चारों ओर से घेर लिया और उनके सरदार जो सबसे बड़ा हाथी था, ने पेड़ को तोड़ कर गिरा दिया और सिन्दबाद को घायल कर दिया और फिर अपनी पीठ पर लाद कर वन में ऐसे स्थान पर ले गया जो कि हाथियों का कब्रगाह था और जहाँ चारों ओर मृत हाथियों की हड्डियों तथा उदन्तों का ढेर लगा था और उस द्वीप से जब सिन्दबाद बगदाद—अपने घर लौटे तो आघा जहाज भर कर हाथी दांत लाये और धनी बन गए; किन्तु वास्तविकता यह है कि हाथियों के कोई कब्रगाह नहीं होते जहाँ वे अपने मृत साथियों को उठाकर ले जाते हों और दफनाते हों। वस्तुतः अन्य जीवित वन्य-पशुओं की भाँति हाथियों की स्वाभाविक तथा प्राकृतिक मृत्यु होती है और लोगों ने वनों में मृत हाथी देखे हैं। 'हाथी दांत के वनों में अक्षय भंडार' कोरी कल्पना है और इस प्रकार के कोई कब्रगाह नहीं हैं जहाँ हाथी दांत के ढेर लगे हों। स्वाभाविक मृत्यु की बेला समीप आने पर हाथी को पूर्वाभास हो जाता है और वह नदी या पोखरे के किनारे पहुँचकर एकान्त में पड़ा मोत की अंतिम घड़ियां गिनता है और उसकी मृत्यु होते ही उसके शव पर चींटियों से लेकर शेर तक, गिद्धों से लेकर गोदड़ तक और विड्भुज (डग बीटिल) से लेकर मछली तक आक्रमण कर देते हैं और देखते-देखते विशालकाय पशु को चट कर जाते हैं और थोड़े दिनों के पश्चात् कोई चिन्ह भी नहीं रहता। एक बार चिटगांव के पहाड़ी क्षेत्र में वन में वन में कर्णकुली नदी में एक महिला तथा उनके भाई ने जंगली हाथी की मृत्यु का दृश्य देखा कि अचानक एक उदन्त पीड़ा से अपना सिर हिलाता हुआ बदहवासी की दशा में वन से निकला और कष्ट से घसिटता हुआ कर्णकुली नदी के जल तक पहुँचा और फिर नदी में डूब गया। यदि अस्वाभाविक मृत्यु के कारण मृत्यु जल के समीप न होकर अन्य स्थान में हो जाये तो भी उपरोक्त जीव-जन्तु मांस तथा हड्डियां चट कर जाते हैं और साही और जंगली जूहों को तो हाथी दांत बहुत पसन्द हैं और वे बड़े चाव से कुतरकुतर—कर खा जाते हैं और वे मनुष्य के पल्ले नहीं पड़ पाते।



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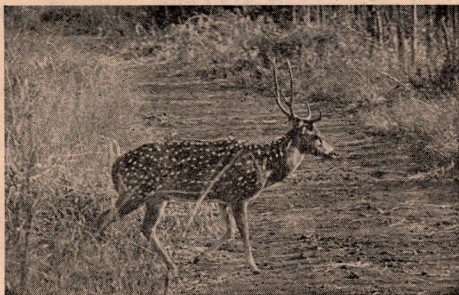
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Wild Life Preservation Society of India

1. The aims and objects of the Society are as follows:—

- (a) To promote interest in and impart knowledge regarding the preservation and conservation of all forms of wild life, particularly among the youth of the country.
- (b) To co-operate with the Govts. of India and States and with other Societies and Institutions having similar aims and objects in working for the interests of wild-life.
- (c) To assist in enforcing and actively supporting the Forest Acts, Wild Birds and Animals Protection Acts and Rules etc. of States and the Indian Arms Act and Rules in so far as they pertain to wild life and to bring to the notice of the authorities any infringement of the same and to assist in the detection and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wild life administrators in the formation, maintenance and protection of Sanctuaries and National Parks, the preservation of wild life in general and rare species of India in particular and in the introduction of exotic species into the country, the rehabilitation of rare species etc. and in the revision on rational lines of the shooting and fishing rules, so as to conserve and increase wild life stocks.
- (e) To raise funds for the carrying out of the above aims and objects and to found and maintain museums, reading rooms and libraries of natural history in order to disseminate knowledge regarding wild life.
- (f) To promote sportsmanship in shikar and to recognise well regulated shooting and fishing, as a means of preserving wild life and fish so that through wise use the surplus may provide a recreational asset to the nation.
- (g) To carry out publicity and propaganda for the preservation of wild life in India by means of monographs, journals, films, film strips and other feasible methods.
- (h) To assist members of the Society in obtaining shooting and fishing facilities and facilities for viewing and photographing wild life in India.
- (i) To conduct research into the problem of Wild Life management in India, and in pursuance of this, to initiate, encourage and, where possible assist in projects for the study of threatened species and related subjects and to provide reference and research facilities for such work.
- (j) To carry on such other activities which will serve the above subjects.

What membership of Wild Life Preservation Society of India will entitle you to ?

1. You will become an active member of the growing group of Wild Life enthusiasts, who enjoy working for and spreading the knowledge of how to conserve India's heritage of Wild Life for posterity.
2. You will be entitled to the full use of the Library of the Wild Life Preservation Society and of its reading room.
3. You will receive a membership certificate.
4. You will receive personal Identification and Membership card.
5. You will be entitled to buy all publications of the Society at a concessional rate.
6. You will be entitled to buy at concessional rates the Society's Greeting Cards, Calendars, Tie, Lapel badge and the Balance of Nature Game (specially Published in colour for its educative and recreational value).
7. You will be supplied "Cheetal", the quarterly journal of the Society free.

For membership particulars write to Honorary Secretary, Wild Life Preservation Society of India, 7 Astley Hall, Dehra Dun.